FIG. 1

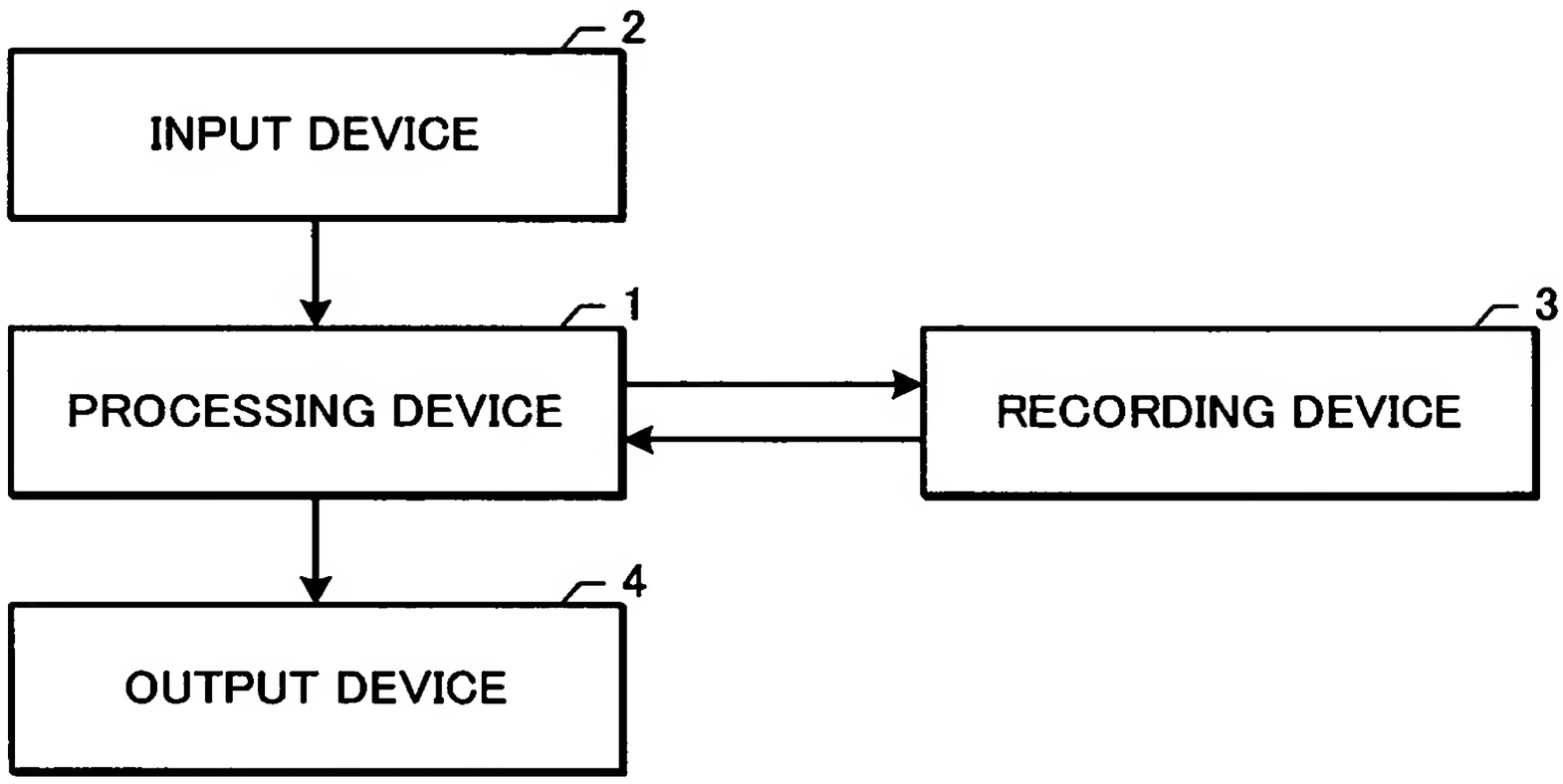

2
INPUT DEVICE
1
PROCESSING DEVICE
3
RECORDING DEVICE
4
OUTPUT DEVICE

FIG. 2

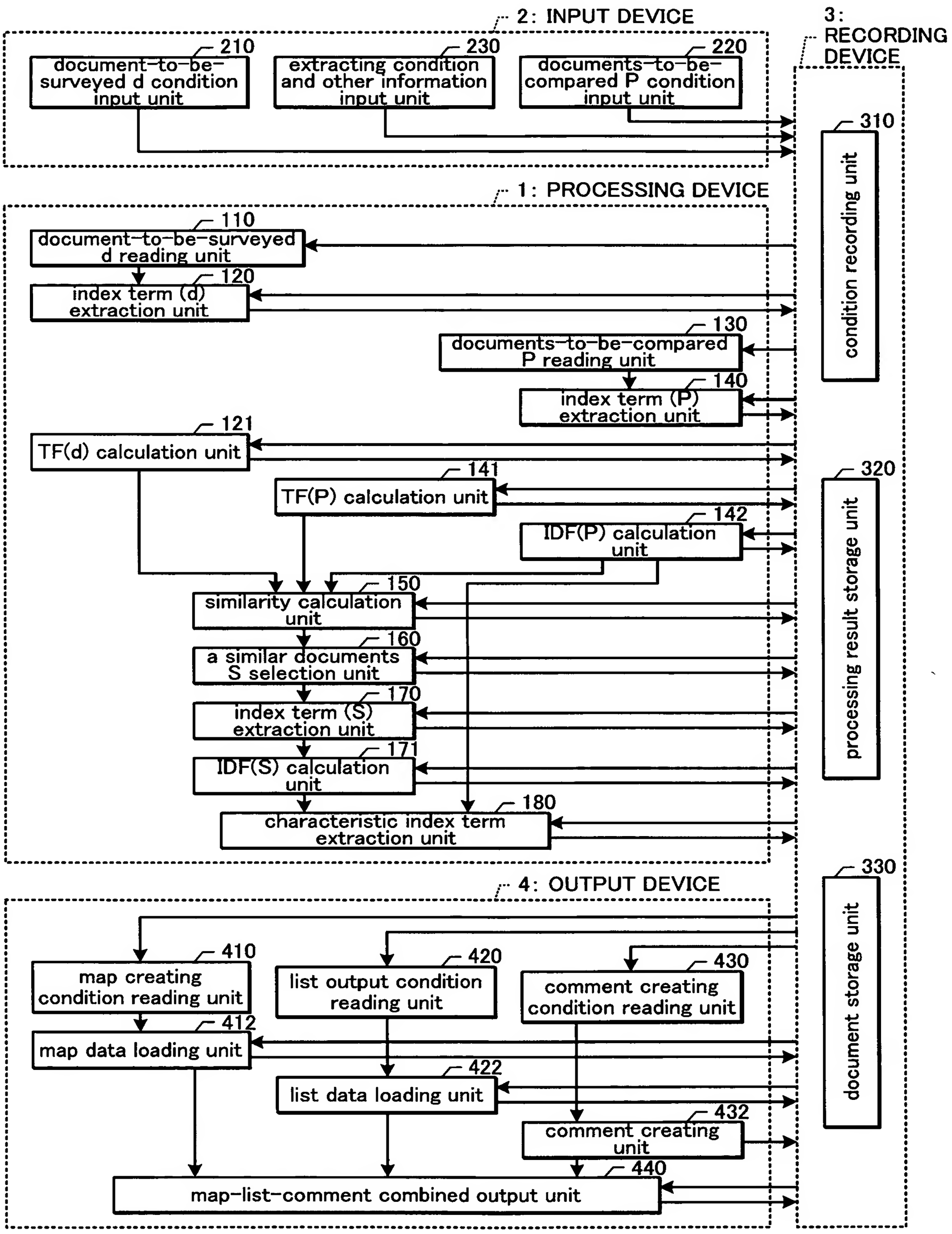

2: INPUT DEVICE
210
document-to-be-surveyed d condition input unit
230
extracting condition and other information input unit
220
documents-to-be-compared P condition input unit
3: RECORDING DEVICE
310
condition recording unit
1: PROCESSING DEVICE
110
document-to-be-surveyed d reading unit
120
index term (d) extraction unit
130
documents-to-be-compared P reading unit
140
index term (P) extraction unit
121
TF(d) calculation unit
141
TF(P) calculation unit
142
IDF(P) calculation unit
150
similarity calculation unit
160
a similar documents S selection unit
170
index term (S) extraction unit
171
IDF(S) calculation unit
180
characteristic index term extraction unit
320
processing result storage unit
330
document storage unit
4: OUTPUT DEVICE
410
map creating condition reading unit
412
map data loading unit
420
list output condition reading unit
422
list data loading unit
430
comment creating condition reading unit
432
comment creating unit
440
map-list-comment combined output unit

FIG. 3

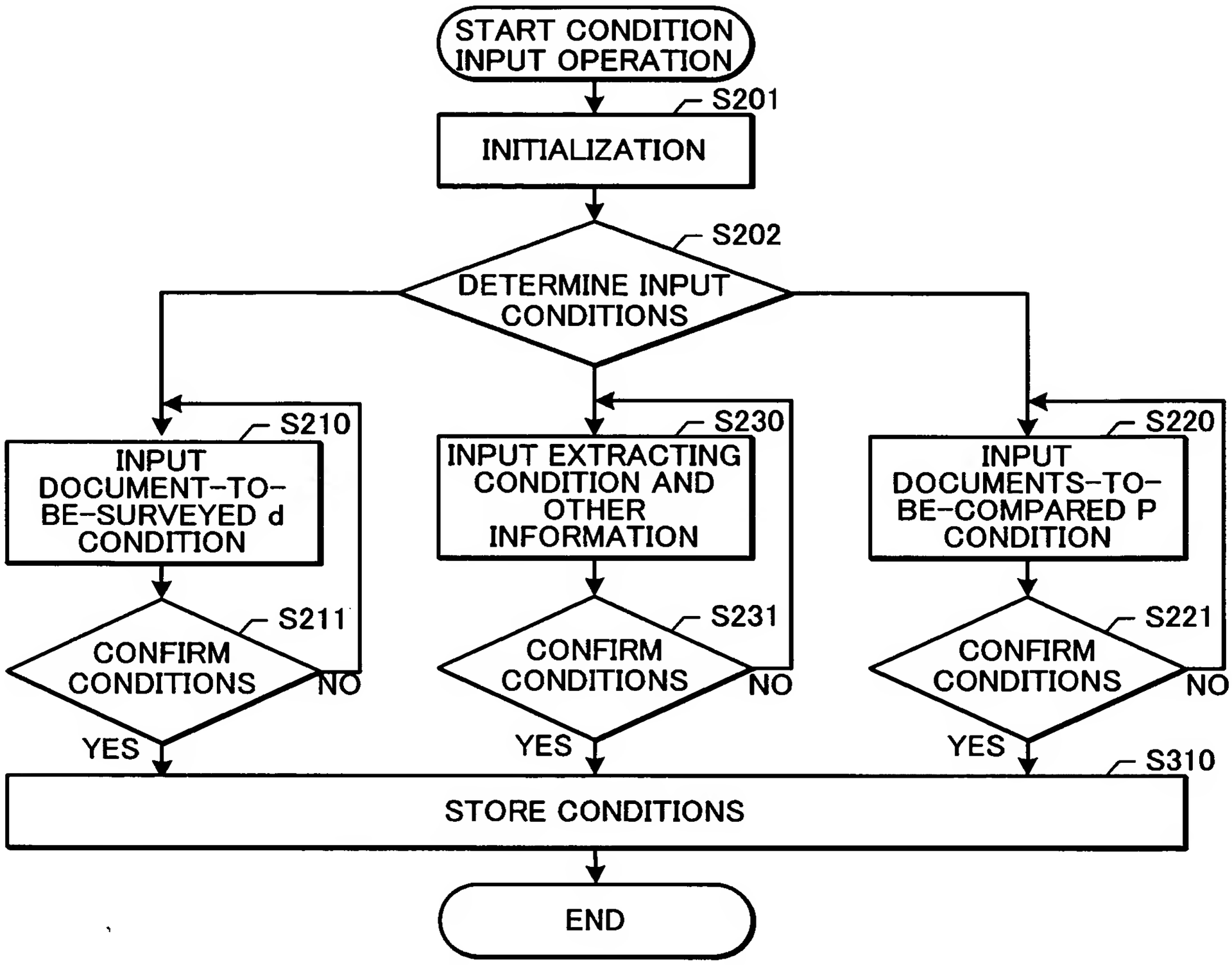

START CONDITION INPUT OPERATION
S201
INITIALIZATION
S202
DETERMINE INPUT CONDITIONS
S210
INPUT DOCUMENT-TO-BE-SURVEYED d CONDITION
S211
CONFIRM CONDITIONS
NO
YES
S230
INPUT EXTRACTING CONDITION AND OTHER INFORMATION
S231
CONFIRM CONDITIONS
NO
YES
S220
INPUT DOCUMENTS-TO-BE-COMPARED P CONDITION
S221
CONFIRM CONDITIONS
NO
YES
S310
STORE CONDITIONS
END

FIG. 4

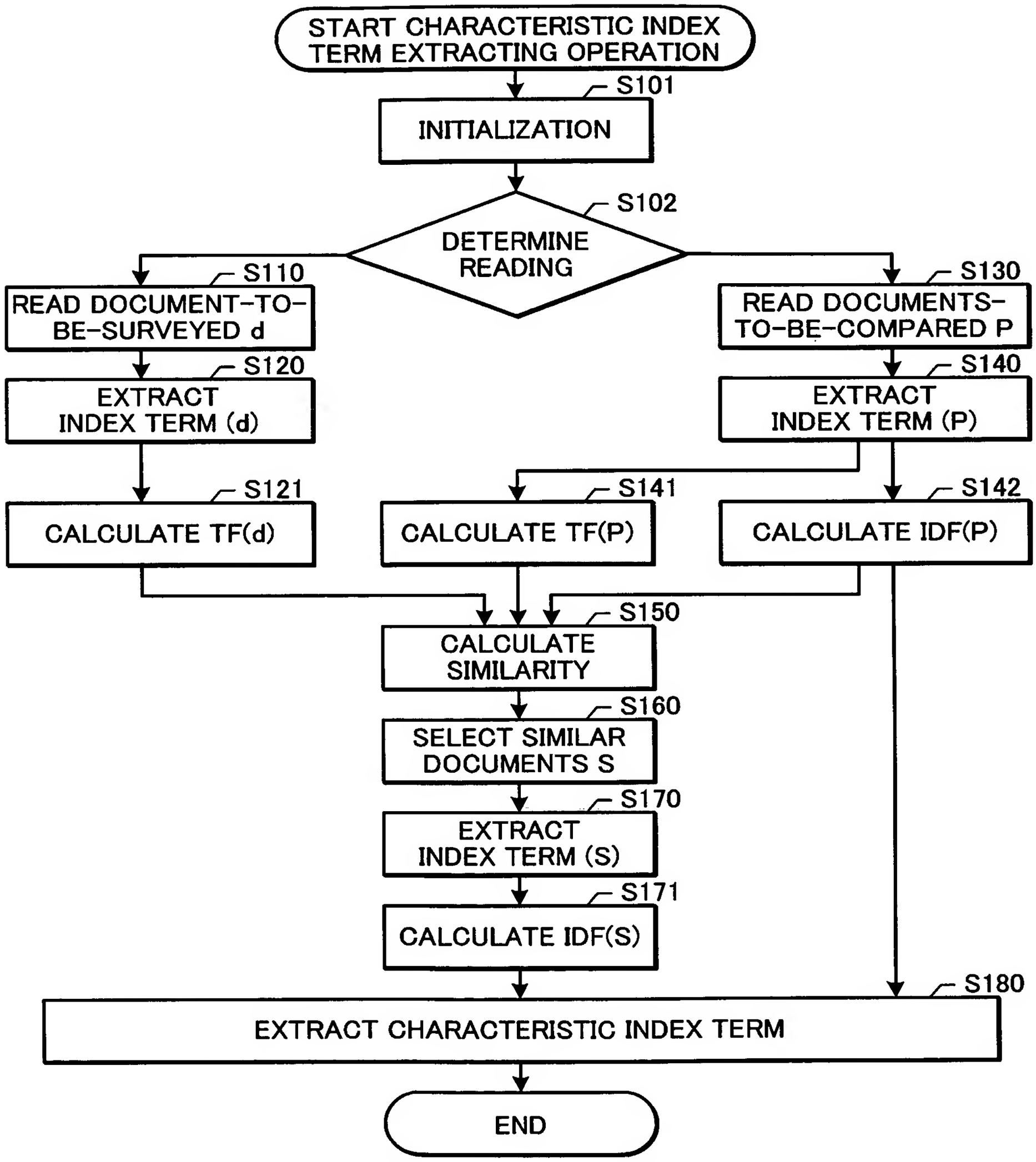

START CHARACTERISTIC INDEX TERM EXTRACTING OPERATION
S101
INITIALIZATION
S102
DETERMINE READING
S110
READ DOCUMENT-TO-BE-SURVEYED d
S120
EXTRACT INDEX TERM (d)
S121
CALCULATE TF(d)
S130
READ DOCUMENTS-TO-BE-COMPARED P
S140
EXTRACT INDEX TERM (P)
S141
CALCULATE TF(P)
S142
CALCULATE IDF(P)
S150
CALCULATE SIMILARITY
S160
SELECT SIMILAR DOCUMENTS S
S170
EXTRACT INDEX TERM (S)
S171
CALCULATE IDF(S)
S180
EXTRACT CHARACTERISTIC INDEX TERM
END

FIG. 5

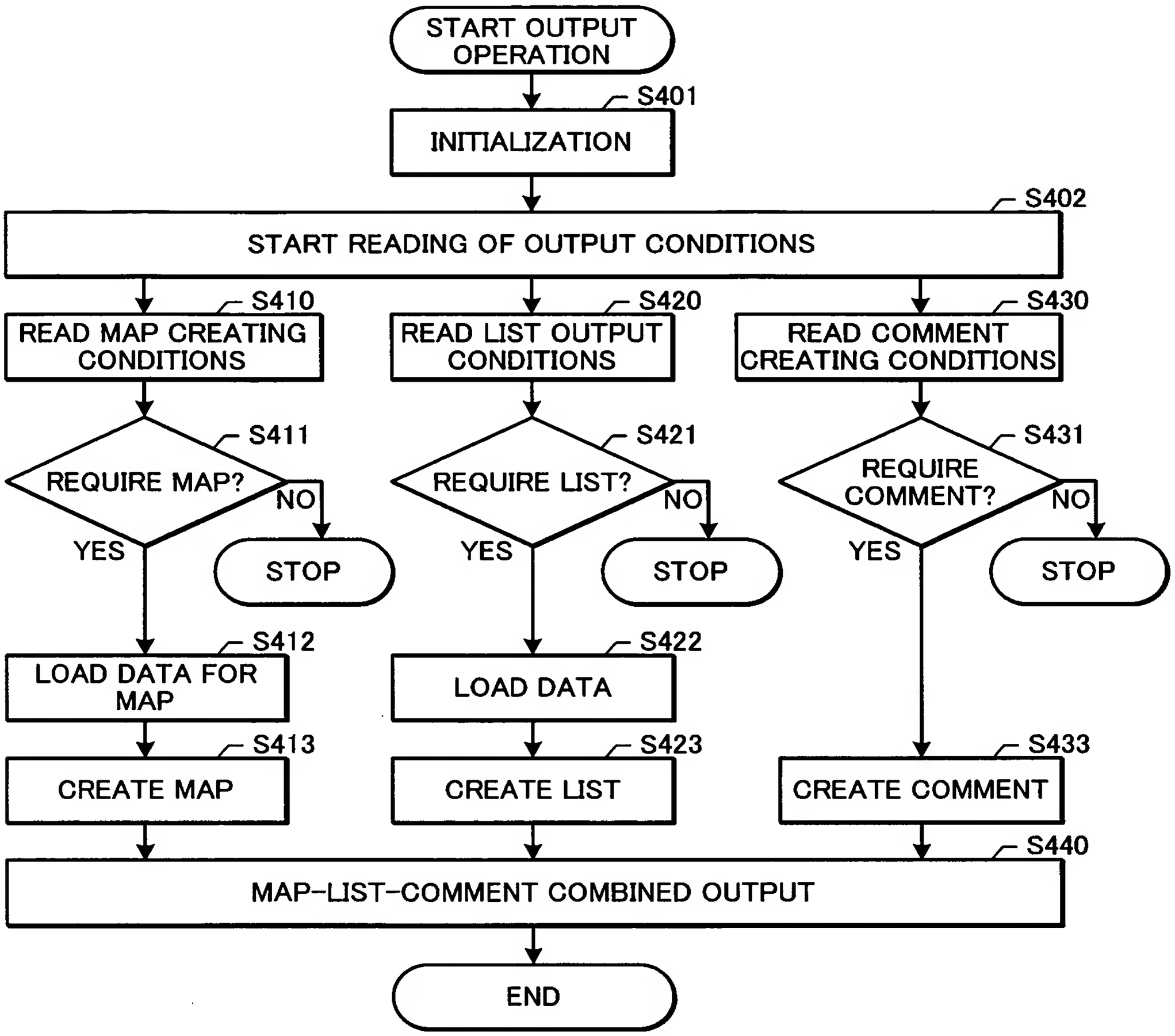

START OUTPUT OPERATION
S401
INITIALIZATION
S402
START READING OF OUTPUT CONDITIONS
S410
READ MAP CREATING CONDITIONS
S420
READ LIST OUTPUT CONDITIONS
S430
READ COMMENT CREATING CONDITIONS
S411
REQUIRE MAP?
NO
YES
STOP
S421
REQUIRE LIST?
NO
YES
STOP
S431
REQUIRE COMMENT?
NO
YES
STOP
S412
LOAD DATA FOR MAP
S422
LOAD DATA
S413
CREATE MAP
S423
CREATE LIST
S433
CREATE COMMENT
S440
MAP-LIST-COMMENT COMBINED OUTPUT
END

FIG. 6

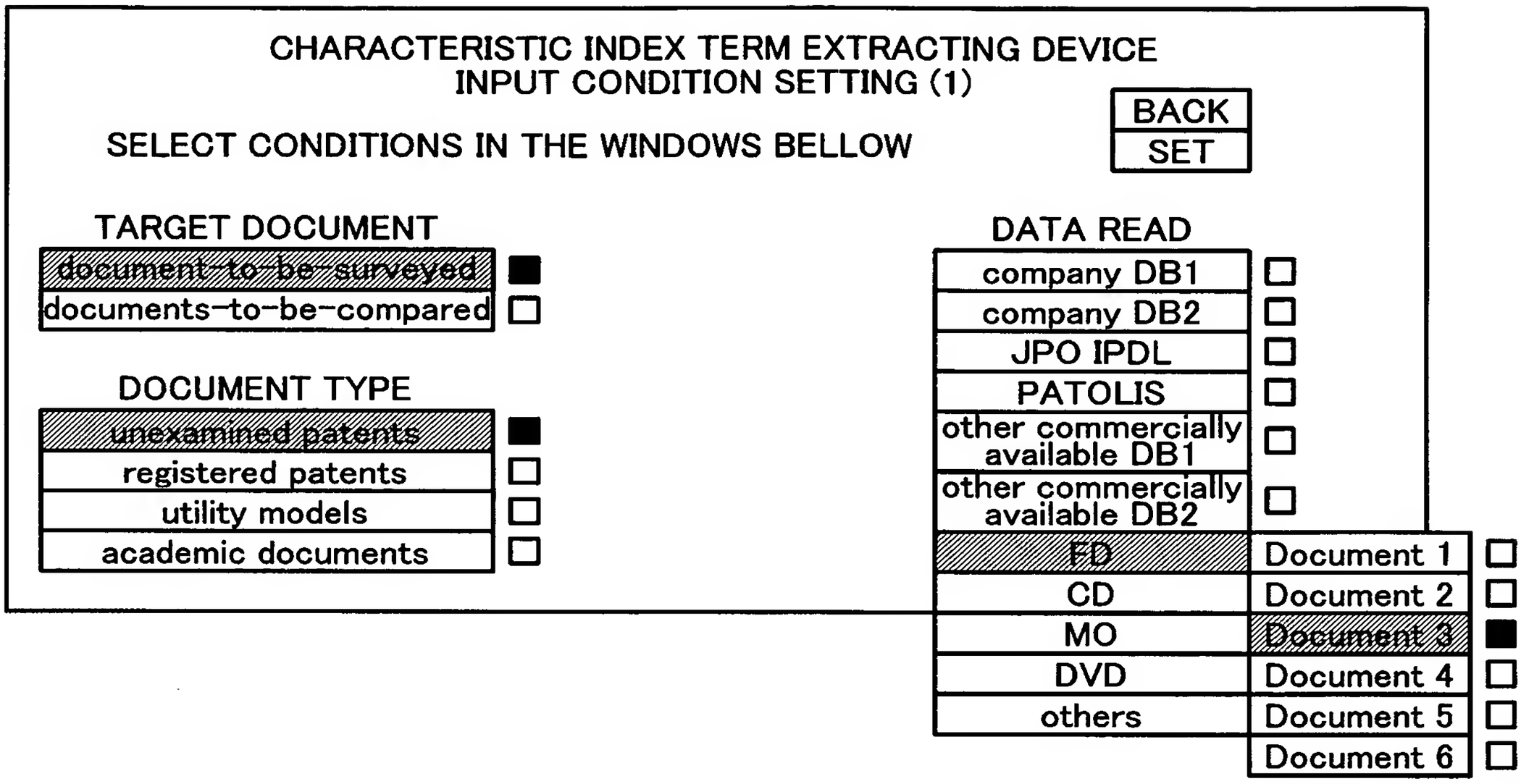

CHARACTERISTIC INDEX TERM EXTRACTING DEVICE
INPUT CONDITION SETTING (1)
SELECT CONDITIONS IN THE WINDOWS BELLOW
BACK
SET
TARGET DOCUMENT
document-to-be-surveyed
documents-to-be-compared
DOCUMENT TYPE
unexamined patents
registered patents
utility models
academic documents
DATA READ
company DB1
company DB2
JPO IPDL
PATOLIS
other commercially available DB1
other commercially available DB2
FD
CD
MO
DVD
others
Document 1
Document 2
Document 3
Document 4
Document 5
Document 6

FIG. 7

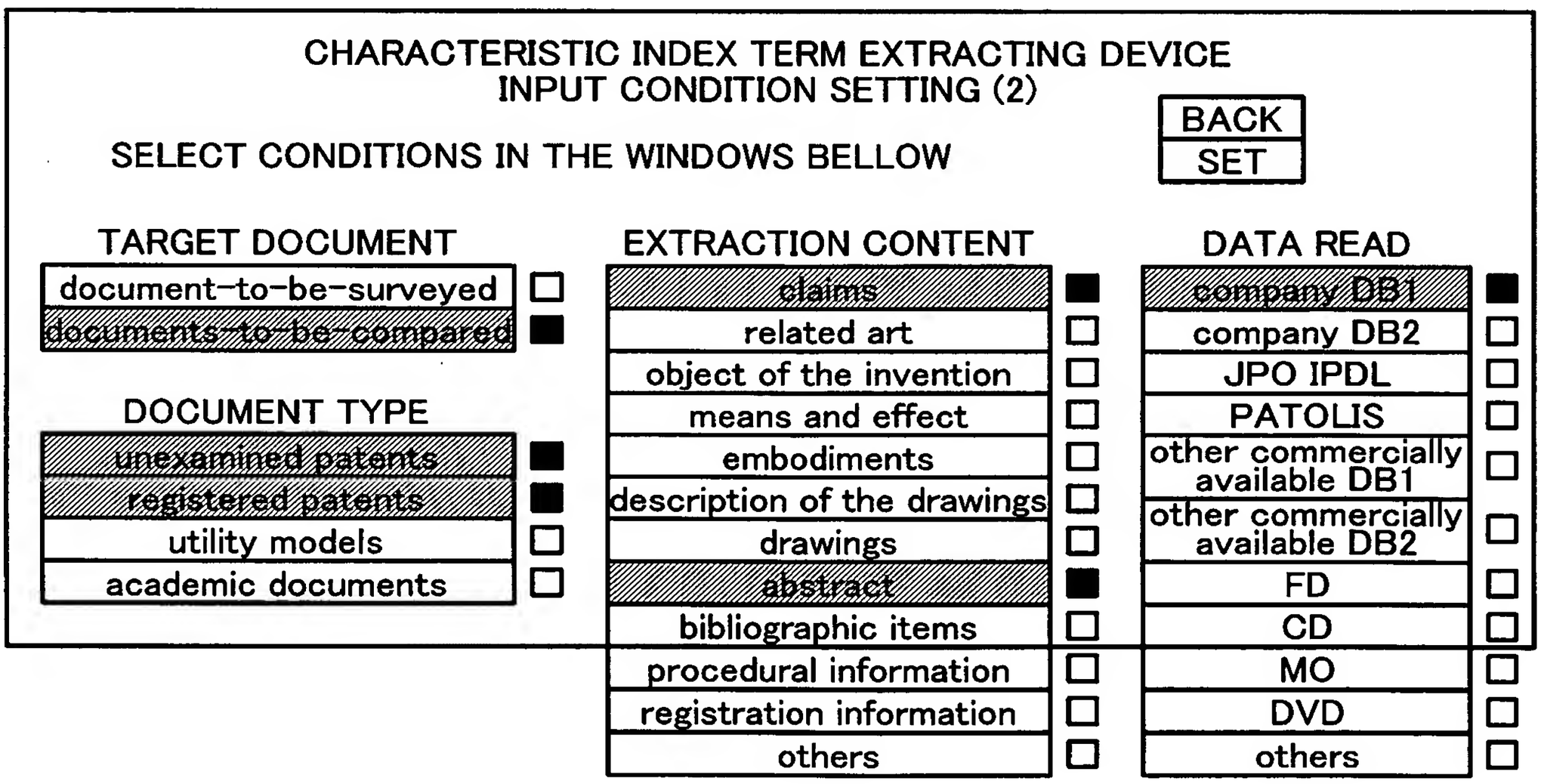

CHARACTERISTIC INDEX TERM EXTRACTING DEVICE
INPUT CONDITION SETTING (2)
SELECT CONDITIONS IN THE WINDOWS BELLOW
BACK
SET
TARGET DOCUMENT
document-to-be-surveyed
documents-to-be-compared
DOCUMENT TYPE
unexamined patents
registered patents
utility models
academic documents
EXTRACTION CONTENT
claims
related art
object of the invention
means and effect
embodiments
description of the drawings
drawings
abstract
bibliographic items
procedural information
registration information
others
DATA READ
company DB1
company DB2
JPO IPDL
PATOLIS
other commercially available DB1
other commercially available DB2
FD
CD
MO
DVD
others

FIG. 8

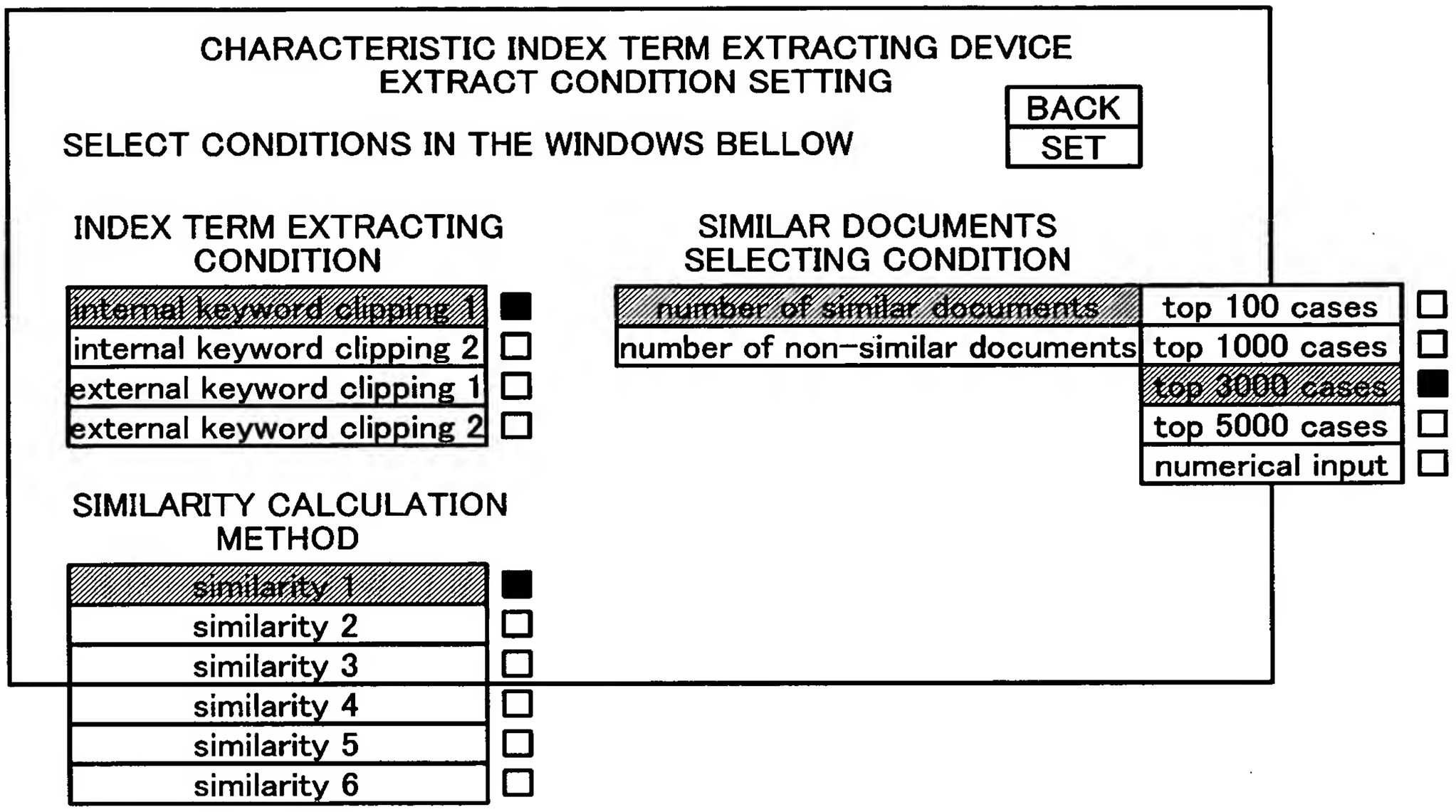

CHARACTERISTIC INDEX TERM EXTRACTING DEVICE
EXTRACT CONDITION SETTING
SELECT CONDITIONS IN THE WINDOWS BELLOW
BACK
SET
INDEX TERM EXTRACTING CONDITION
internal keyword clipping 1
internal keyword clipping 2
external keyword clipping 1
external keyword clipping 2
SIMILAR DOCUMENTS SELECTING CONDITION
number of similar documents
number of non-similar documents
top 100 cases
top 1000 cases
top 3000 cases
top 5000 cases
numerical input
SIMILARITY CALCULATION METHOD
similarity 1
similarity 2
similarity 3
similarity 4
similarity 5
similarity 6

FIG. 9

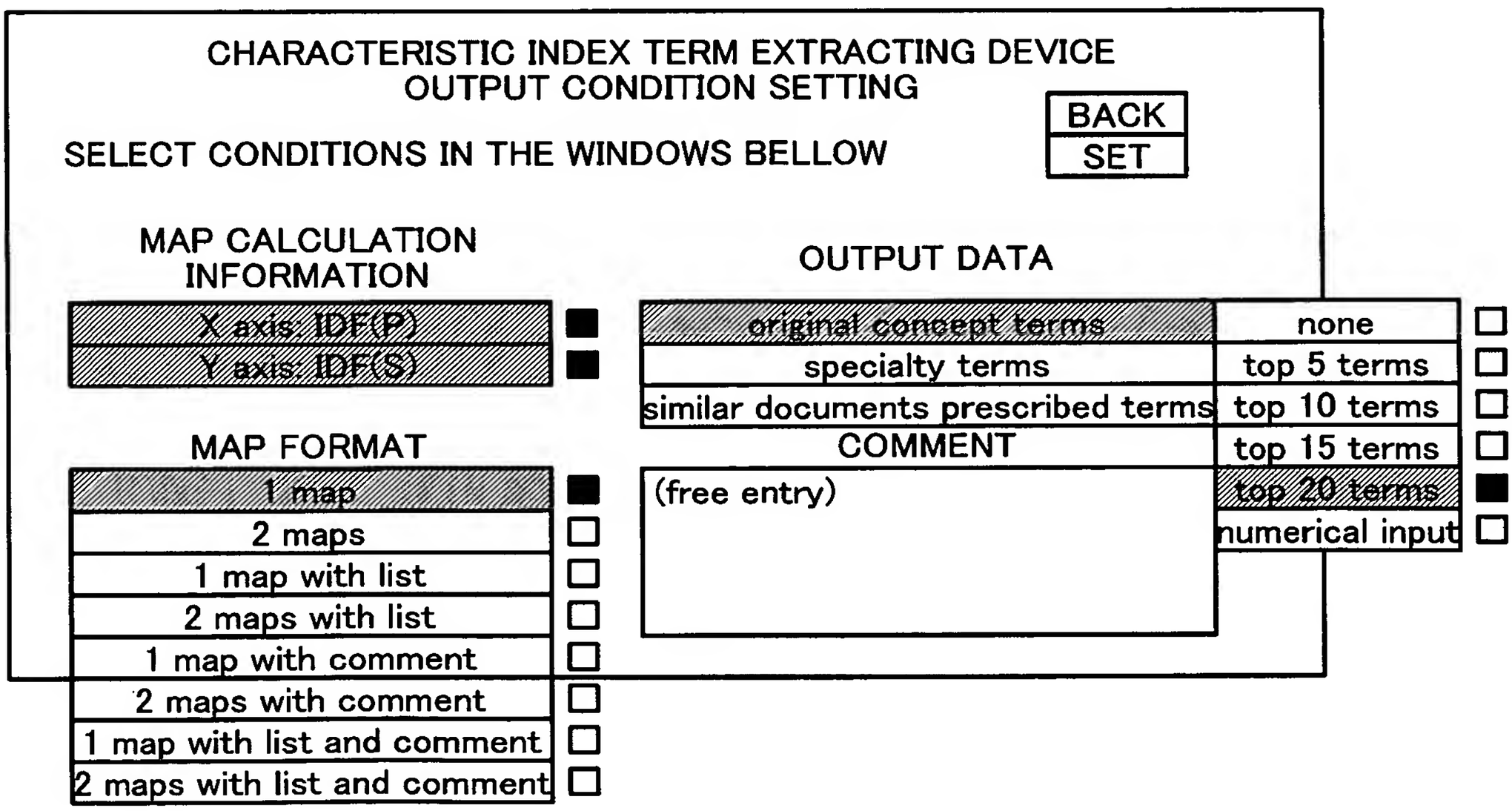

CHARACTERISTIC INDEX TERM EXTRACTING DEVICE
OUTPUT CONDITION SETTING
SELECT CONDITIONS IN THE WINDOWS BELLOW
BACK
SET
MAP CALCULATION INFORMATION
X axis: IDF(P)
Y axis: IDF(S)
MAP FORMAT
1 map
2 maps
1 map with list
2 maps with list
1 map with comment
2 maps with comment
1 map with list and comment
2 maps with list and comment
OUTPUT DATA
original concept terms
specialty terms
similar documents prescribed terms
COMMENT
(free entry)
none
top 5 terms
top 10 terms
top 15 terms
top 20 terms
numerical input

FIG. 10

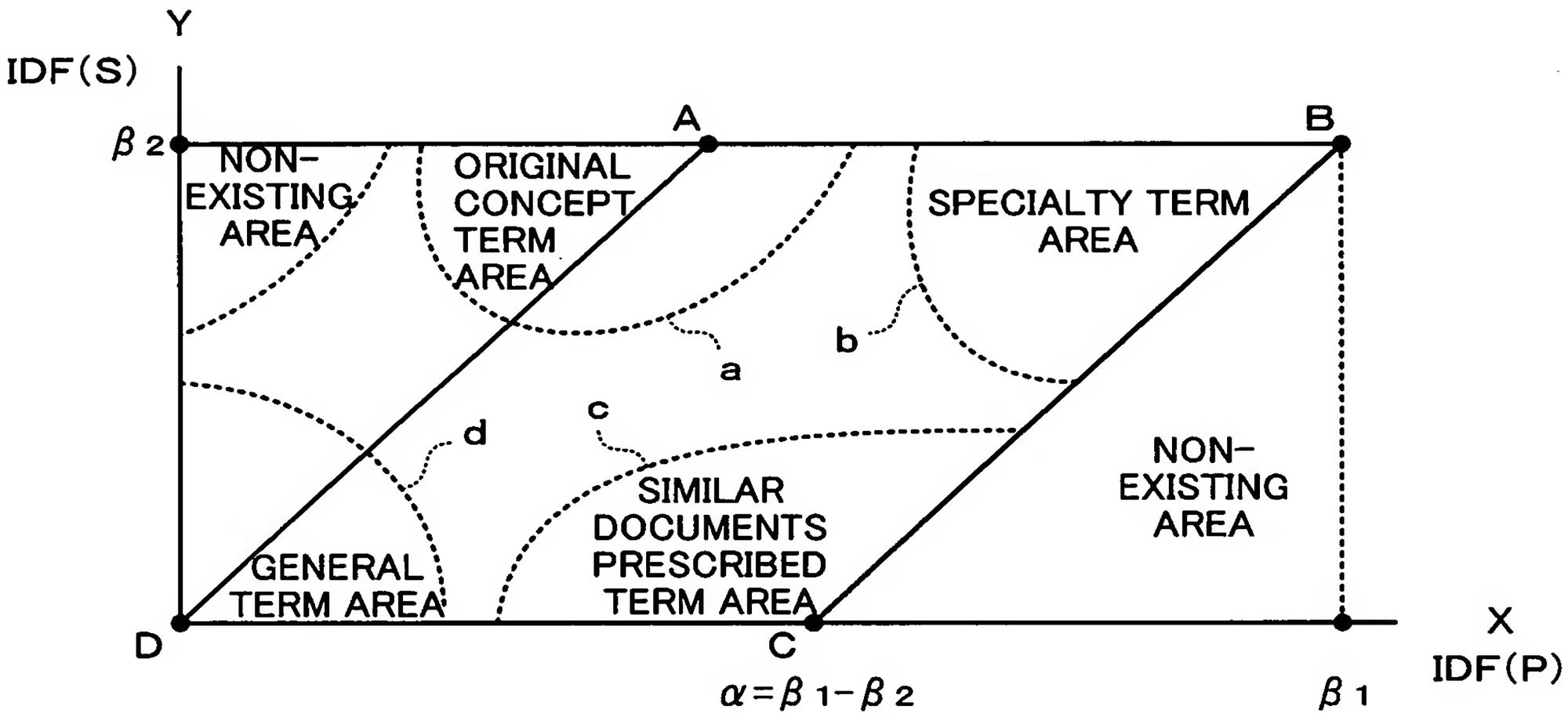

Y
IDF(S)
β 2
A
B
NON-
EXISTING
AREA
ORIGINAL
CONCEPT
TERM
AREA
SPECIALTY TERM
AREA
a
b
c
d
SIMILAR
DOCUMENTS
PRESCRIBED
TERM AREA
NON-
EXISTING
AREA
GENERAL
TERM AREA
D
C
X
IDF(P)
α=β 1−β 2
β 1

FIG. 11

"External Auxiliary Storage Device" IDF Plane

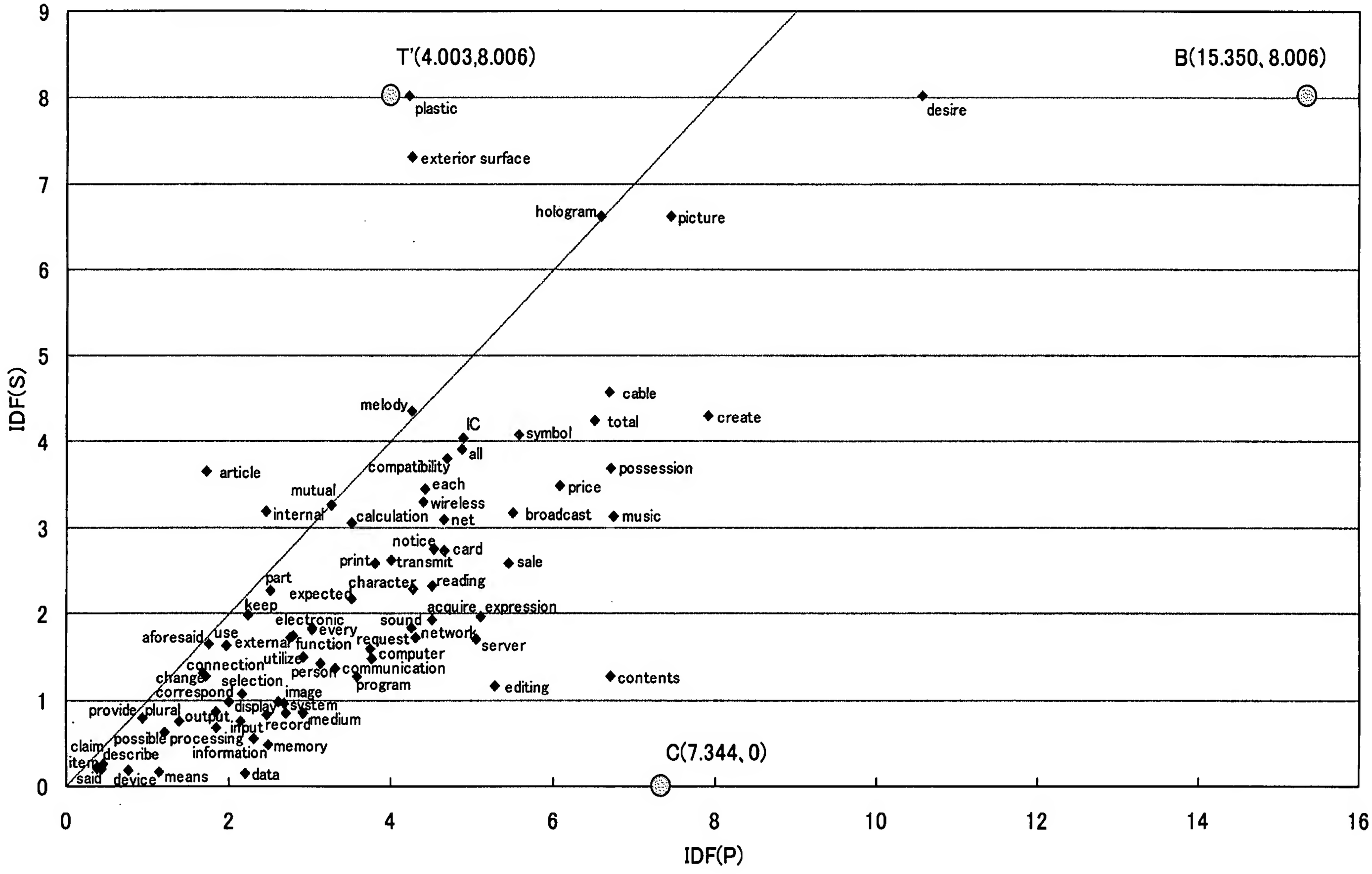


FIG. 12

"External Auxiliary Storage Device"
Extracted up to 20 words from each area

Order of X' value	a : Original concept terms	b : Specialty terms	c : Similar documents prescribed terms	d : General terms
1	picture		contents	aforesaid
2	hologram		editing	provide
3	symbol		expression	claim
4	IC		server	item
5	all		acquire	describe
6	compatibility		network	said
7	net		sound	keep
8	card		computer	use
9	notice		request	change
10	each		program	connection
11	wireless		communication	possible
12	character		person	device
13	exterior surface		every	plural
14	melody		electronic	means
15	plastic		medium	output
16	transmit		utilize	correspond
17	print		function	external
18	calculation		external	function
19	expected		record	selection
20	communication		system	processing

FIG. 13

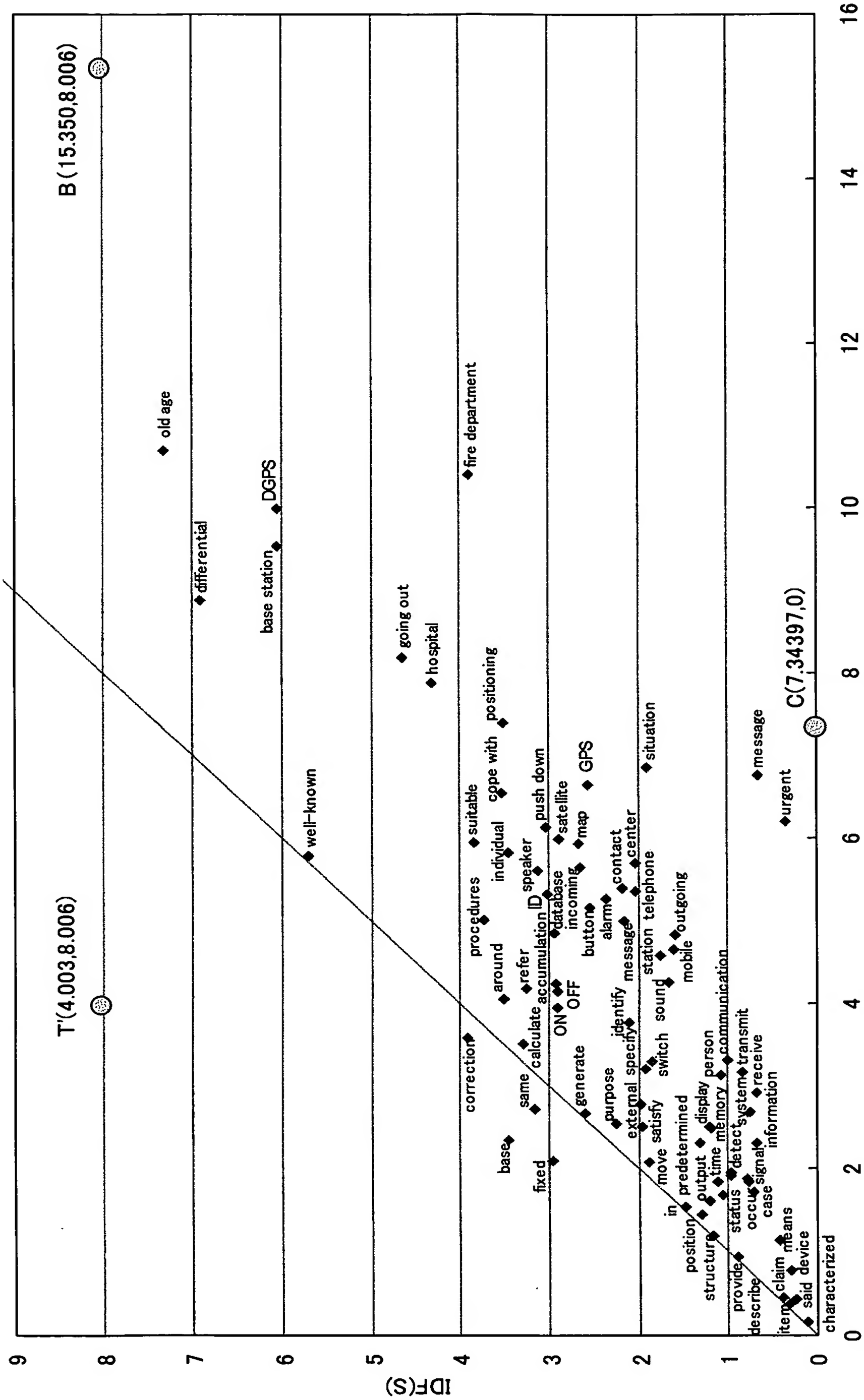

"Urgent Message" IDF Plane
B(15.350,8.006)
T'(4.003,8.006)
C(7.34397,0)
IDF(S)
IDF(P)
old age
differential
DGPS
base station
well-known
going out
hospital
fire department
suitable
procedures
individual
cope with
positioning
push down
satellite
GPS
map
center
situation
speaker
database
incoming
button
alarm
contact
message
station
telephone
mobile
outgoing
urgent
message
correction
same
calculate
base
fixed
generate
ON
OFF
purpose
identify
external specify
satisfy
move
switch
sound
predetermined
output
display
person
memory
communication
transmit
receive
information
detect
system
signal
case
occur
status
provide
describe
position
structure
item
claim
means
said device
characterized

FIG. 14

"Urgent Message"
Extracted up to 20 words from each area

Order of X' value	a : Original concept terms	b : Specialty terms	c : Similar documents prescribed terms	d : General terms
1	differential	fire department	situation	structure
2	well-known		message	in
3	procedures		urgent	characterized
4	database		center	provide
5	accumulation		telephone	claim
6	refer		outgoing	item
7	OFF		mobile	describe
8	around		station	position
9	ON		sound	move
10	identify		communication	said
11	correction		switch	predetermined
12	calculate		specify	device
13	switch		transmit	satisfy
14	specify		person	status
15	person		receive	means
16	external		external	output
17	same		system	external
18	system		satisfy	detect
19	generate		memory	occur
20	purpose		display	time

FIG. 15

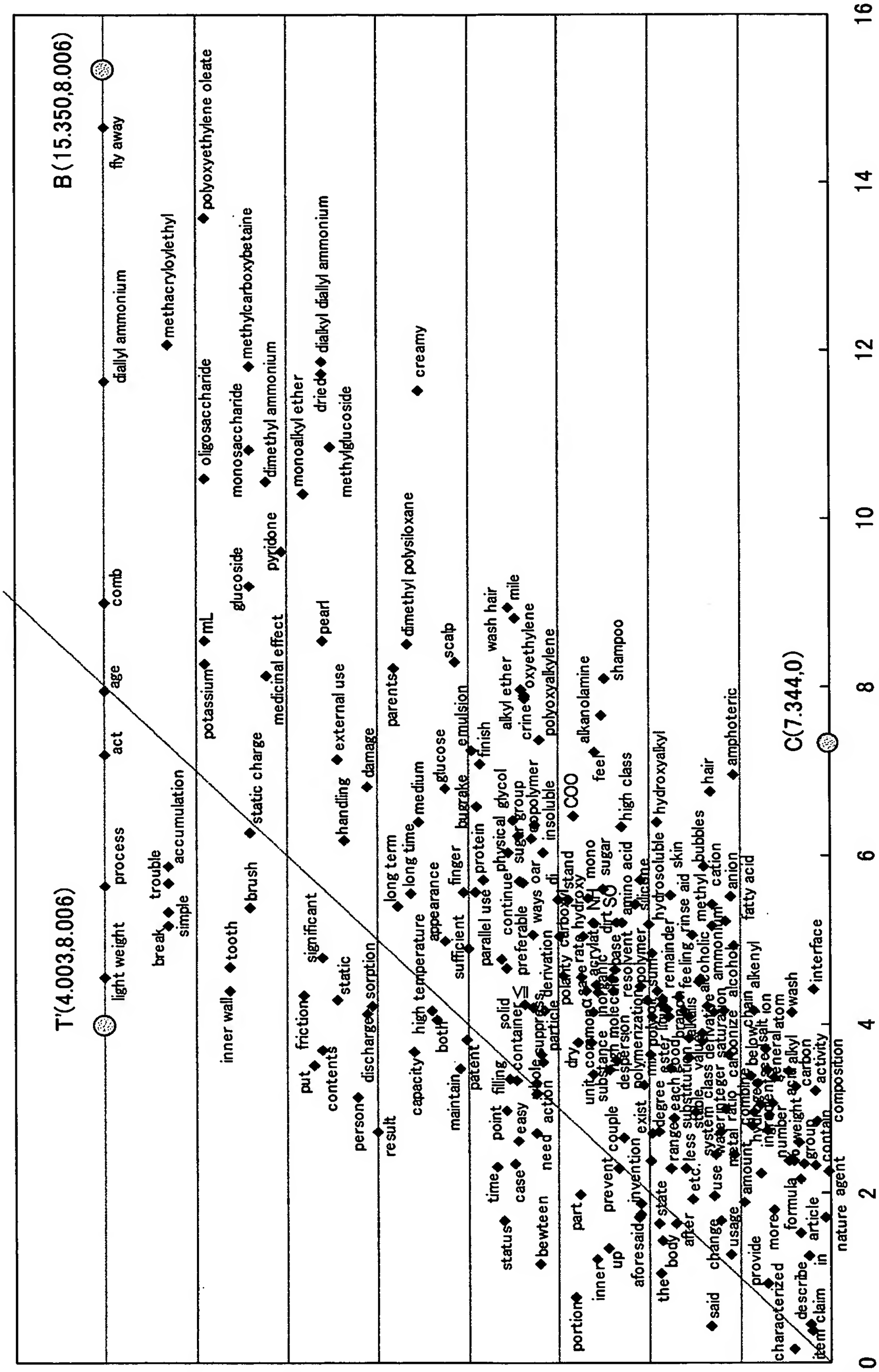

"Hair Shampoo" IDF Plane
B(15.350,8.006)
C(7.344,0)
T'(4.003,8.006)
IDF(P)
IDF(S)
0
2
4
6
8
10
12
14
16
1
3
5
7
9
fly away
diallyl ammonium
methacryloylethyl
oligosaccharide
polyoxyethylene oleate
monosaccharide
methylcarboxybetaine
dimethyl ammonium
monoalkyl ether
dried
dialkyl diallyl ammonium
methylglucoside
creamy
light weight
process
act
age
comb
trouble
accumulation
potassium
mL
glucoside
brush
static charge
medicinal effect
pyridone
pearl
handling
external use
damage
parents
dimethyl polysiloxane
long term
long time
medium
glucose
finger
bugrake
emulsion
scalp
protein
finish
wash hair
physical
glycol
alkyl ether
mile
sugar
group
copolymer
crine
oxyethylene
insoluble
polyoxyalkylene
stand
COO
alkanolamine
hydroxy
mono
feel
NH
dirt
SO
sugar
shampoo
amino acid
high class
silicone
hydrosoluble
hydroxyalkyl
rinse aid
skin
methyl
bubbles
hair
cation
anion
amphoteric
fatty acid
inner wall
tooth
put
friction
contents
static
person
discharge
sorption
result
capacity
high temperature
both
maintain
patent
time
point
filling
solid
container
case
easy
whole
suppress
particle
status
bewteen
need
action
sufficient
parallel
polarity
dry
unit
substance
high molecular
base
resolvent
desperson
polymerization
polymer
sum
remainder
feeling
alcoholic
portion
part
inner
up
prevent
couple
invention
exist
aforesaid
degree
ester
range
each
good
branch
less
substitution
alkalis
stable
value
derivation
system
class
saturation
ammonium
alcohol
said
change
use
water
integer
carbonize
body
state
the
metal
ratio
amount
combine
below
chain
alkenyl
provide
more
formula
number
weight
acid
alkyl
wash
characterized
describe
article
in
claim
item
group
carbon
activity
interface
contain
nature
agent
composition

FIG. 16

"Hair Shampoo"
Extracted up to 20 words from each area

Order of X' value	a : Original concept terms	b : Specialty terms	c : Similar documents prescribed terms	d : General terms
1	comb	fly away	amphoteric	said
2	mL	Polyoxyethylene oleate	hair	the
3	potassium	methylcarboxybetaine	hydroxyalkyl	body
4	medicinal effect	dialkyl diallyl ammonium	bubbles	state
5	age	dried	skin	characterized
6	act	methylglucoside	anion	after
7	external use	creamy	cation	usage
8	damage	mile	fatty acid	claim
9	medium	wash hair	silicone	item
10	static charge	shampoo	ammonium	describe
11	handling		rinse aid	provide
12	accumulation		alkenyl	invention
13	protein		hydrosoluble	etc.
14	trouble		alcoholic	change
15	process		alcohol	range
16	parallel use		interface	use
17	finger		remainder	less
18	long time		methyl	exist
19	long term		feeling	degree
20	brush		sum	amount

FIG. 17

"External Auxiliary Storage Device" IDF Plane

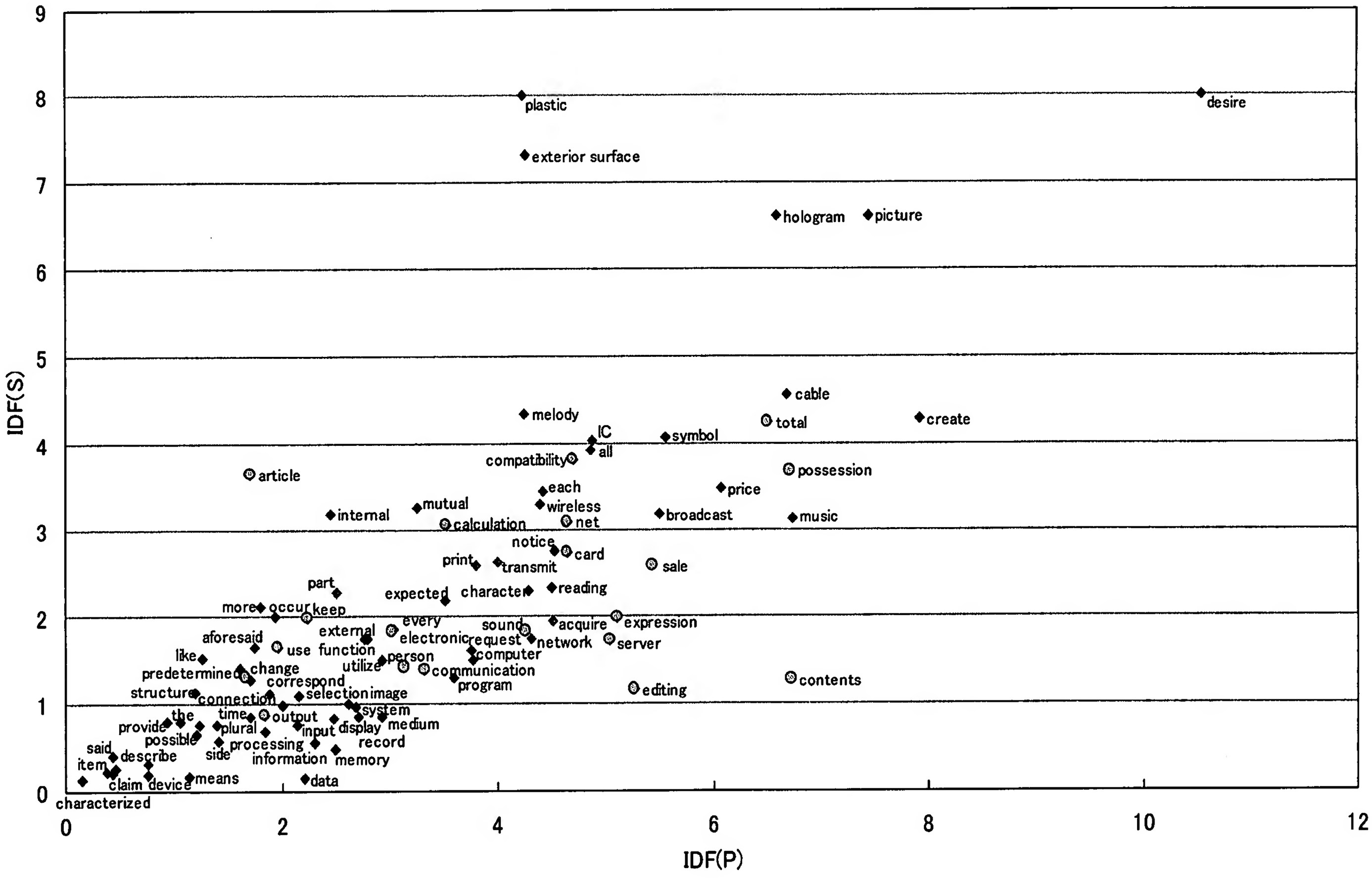


FIG. 18

"External Auxiliary Storage Device" IDF Plane

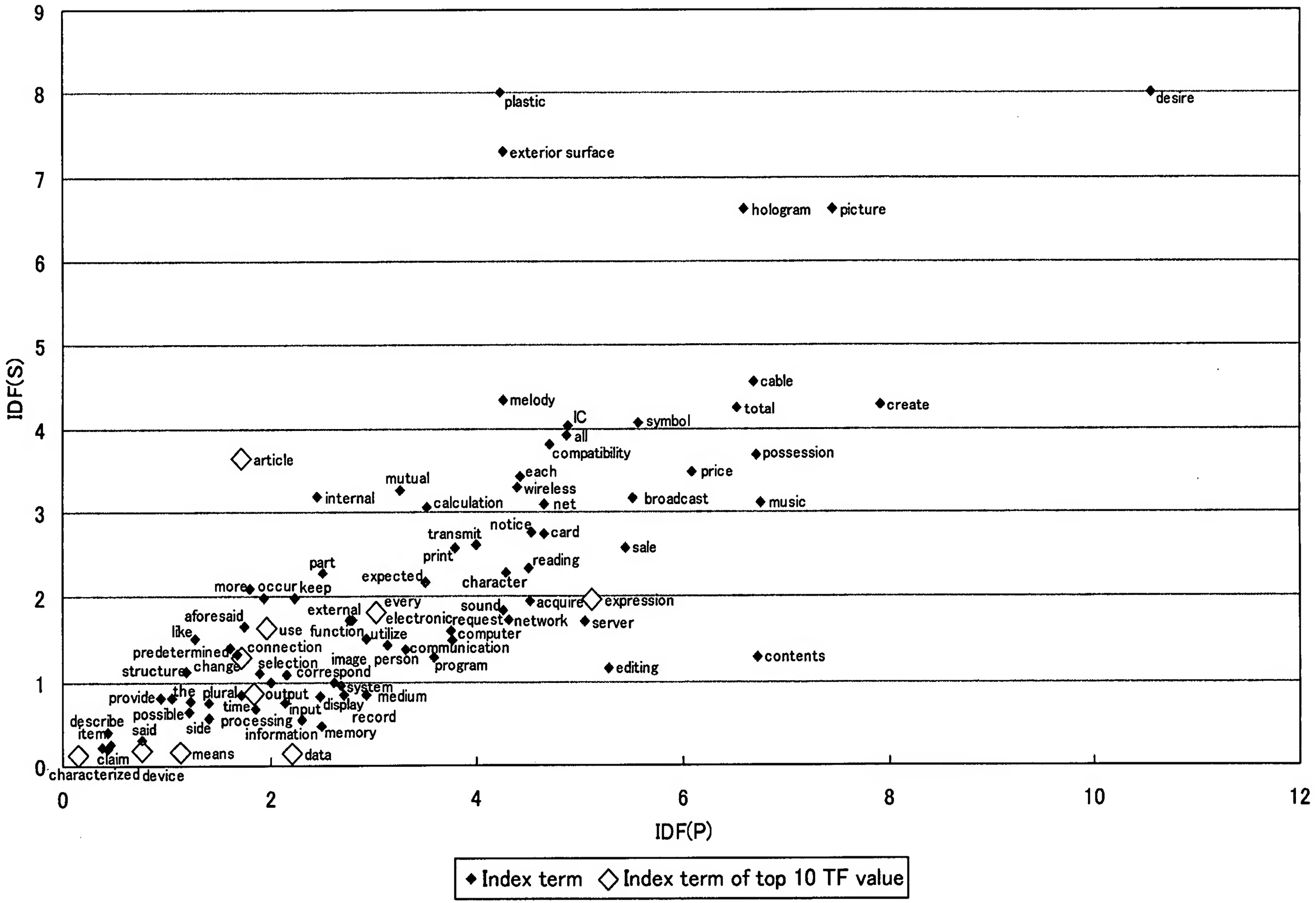


FIG. 19

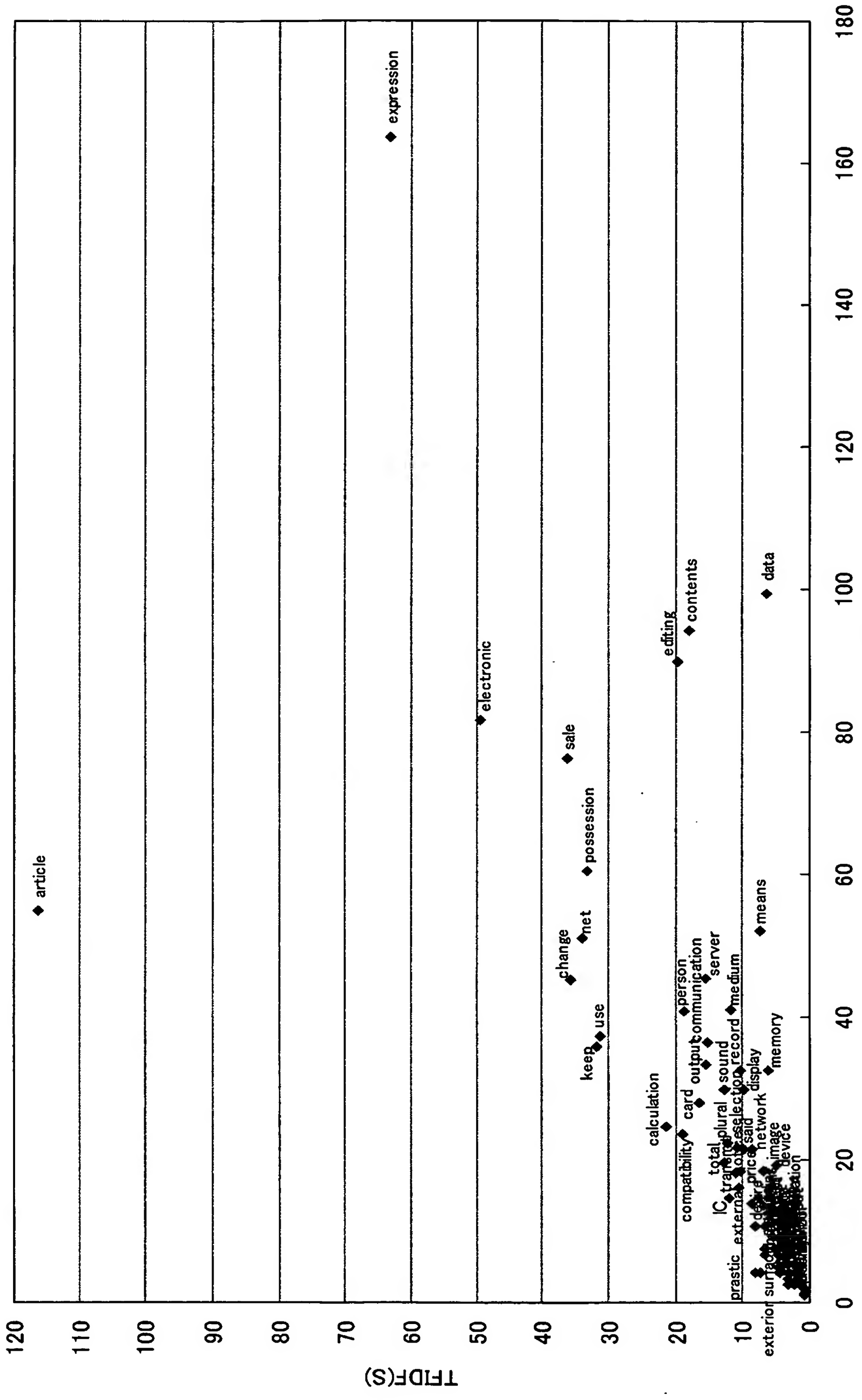

"External Auxiliary Storage Device" TFIDF Plane
TFIDF(S)
TFIDF(P)
expression
article
electronic
sale
possession
editing
contents
data
means
change
net
use
keep
person
communication
server
medium
record
sound
display
memory
calculation
compatibility
card
output
plural
said
network
image
device
price
total
IC
exterior

FIG. 20

"External Auxiliary Storage Device" DF Plane

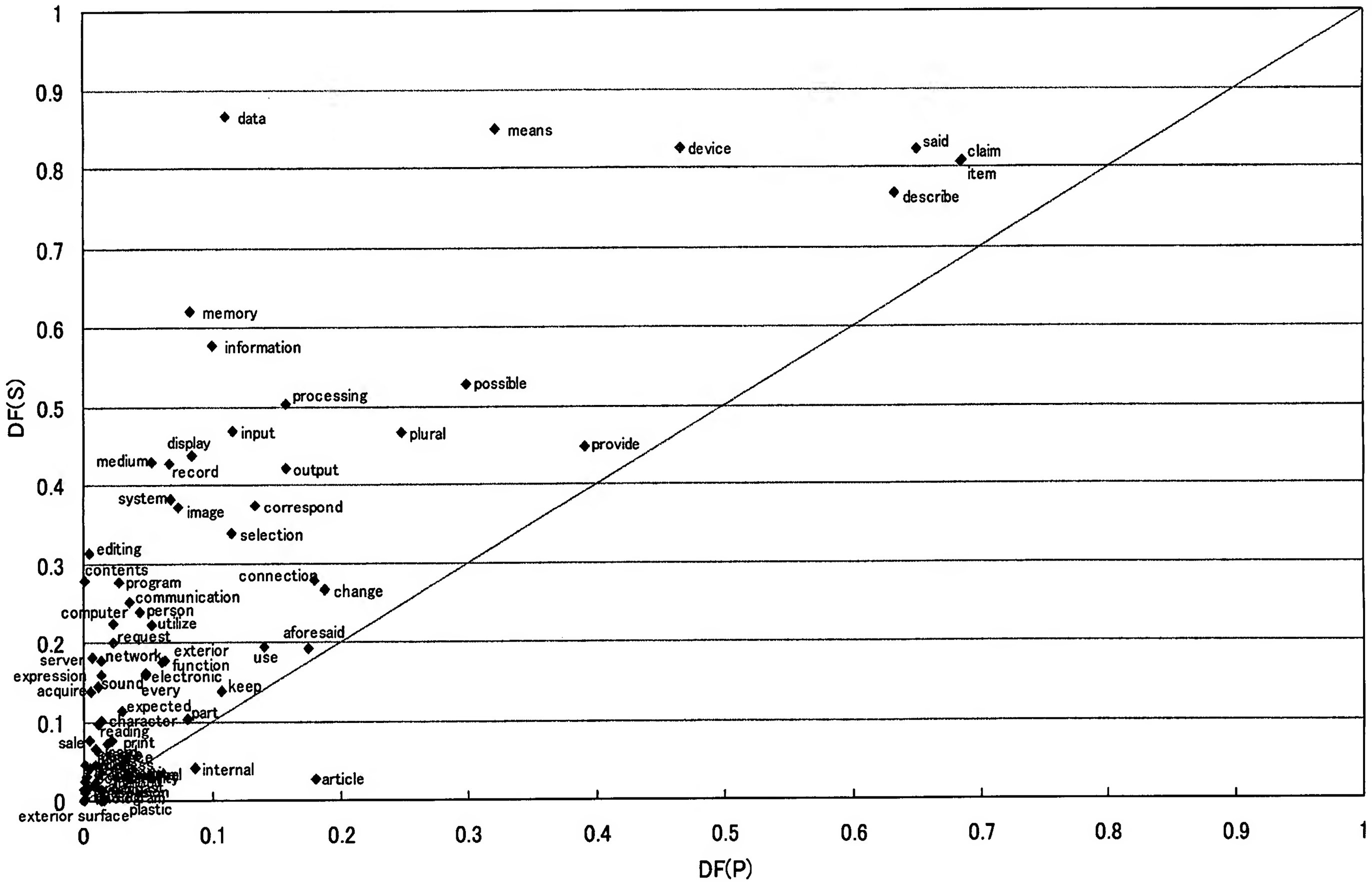


FIG. 21

"External Auxiliary Storage Device" IDF Plane -Linear Transformation-

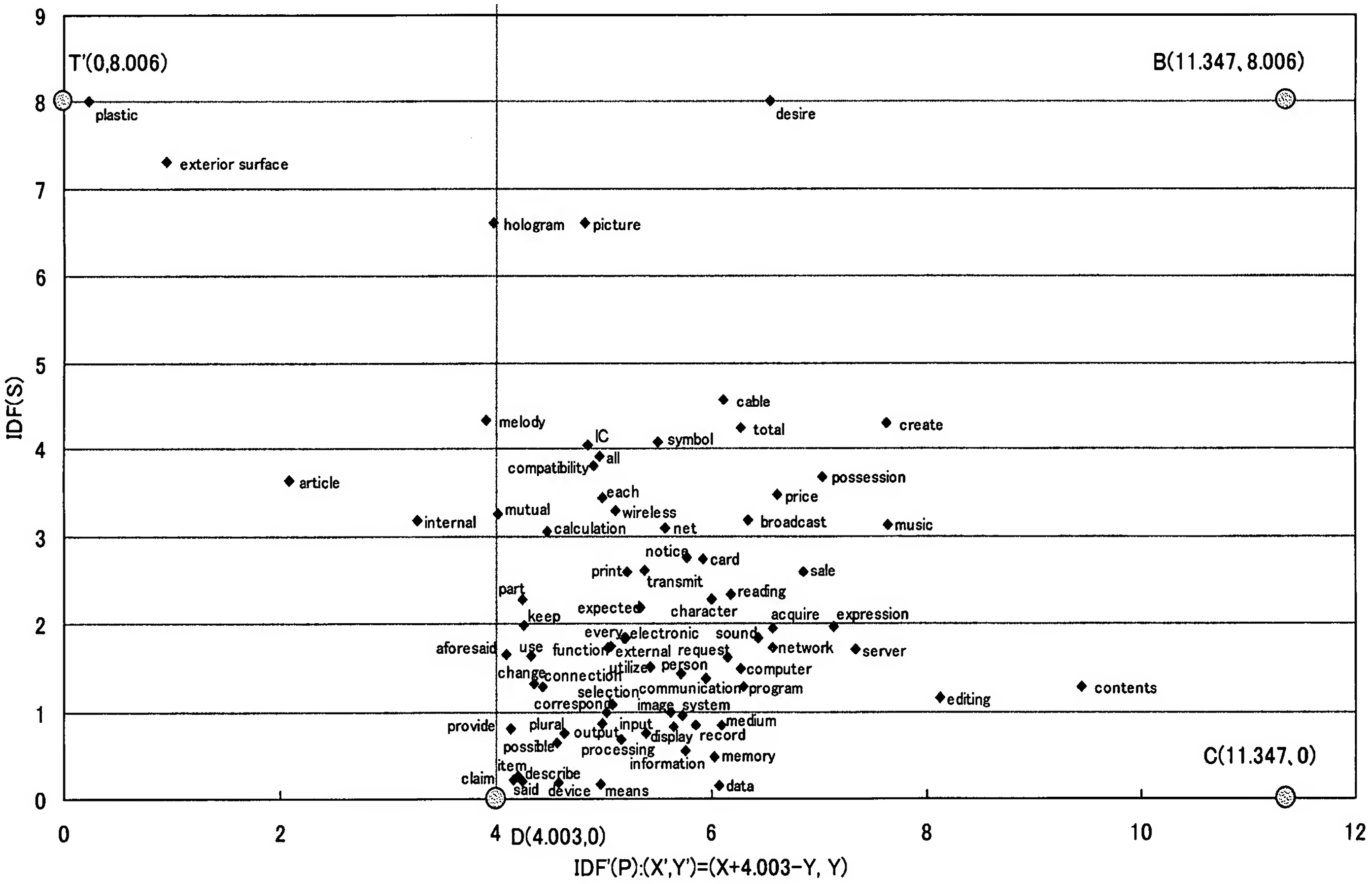


FIG. 22

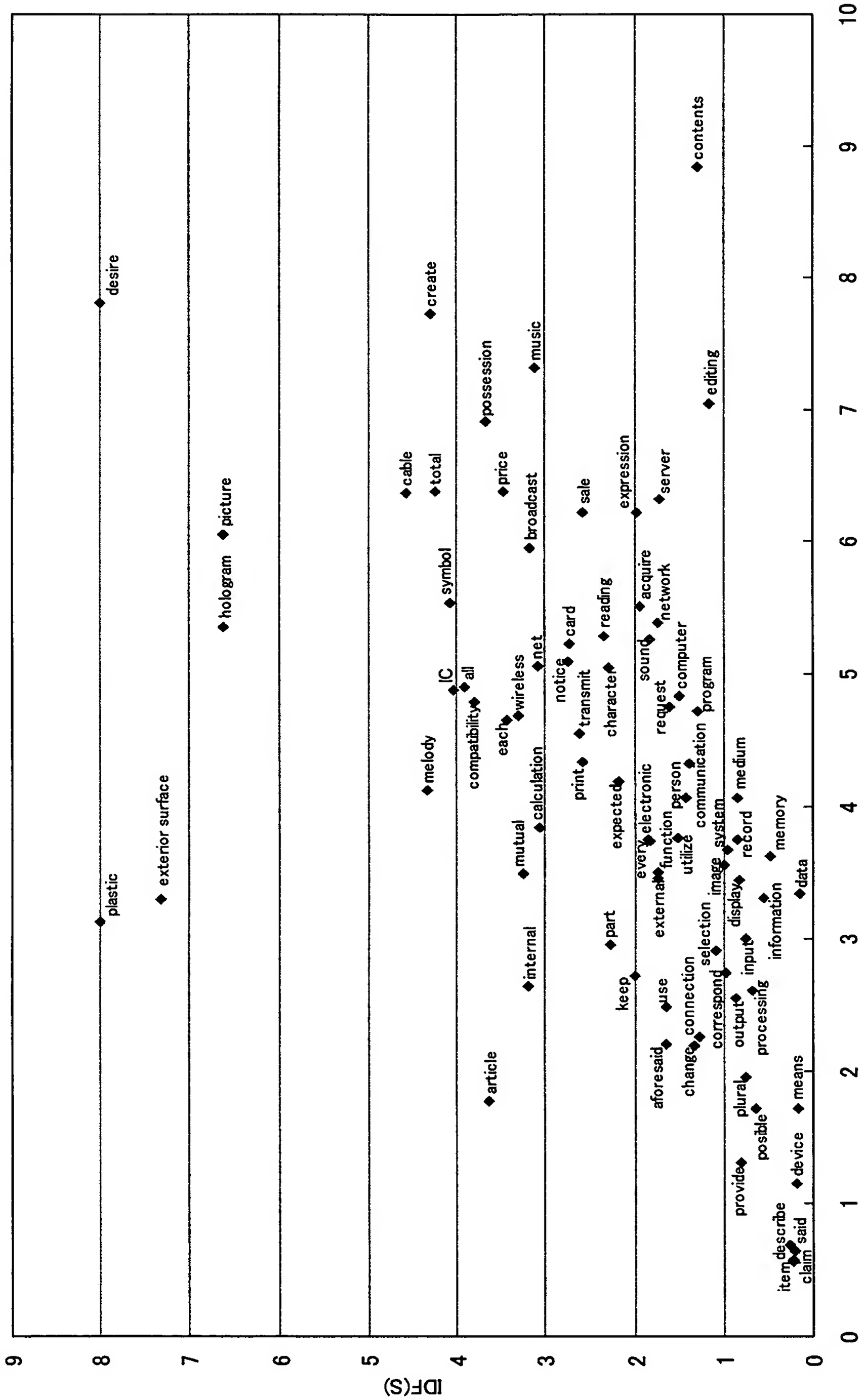

"External Auxiliary Storage Device" IDF Plane -Scale Transformation-
IDF(S)
IDF'(P):(X',Y')=(X*(α+β2/2)/(Y+α), Y)
0
1
2
3
4
5
6
7
8
9
10
article
aforesaid
change
item
describe
claim
said
provide
plural
possible
device
means
data
memory
information
input
display
record
medium
image
system
function
person
utilize
communication
external
every
electronic
use
connection
selection
correspond
output
processing
part
expected
keep
print
transmit
character
reading
notice
card
sale
expression
request
computer
program
sound
acquire
network
server
each
wireless
net
mutual
calculation
internal
compatibility
all
IC
melody
cable
total
symbol
broadcast
price
possession
music
editing
contents
exterior surface
plastic
hologram
picture
create
desire

FIG. 23

"External Auxiliary Storage Device" IDF Plane -Lower Half Hyperbolic Transformation-
B(11.347, 8.006)
C(11.347, 0)
T'(0,8.006)
desire
hologram
picture
cable
total
create
melody
IC
symbol
possession
price
compatibility
all
broadcast
music
each
wireless
net
notice
card
mutual
calculation
print
transmit
sale
reading
part
every
expected
character
acquire
expression
keep
function
electronic
sound
network
server
external
request
computer
utilize
person
communication
program
editing
selection
image
system
display
record
medium
information
memory
data
exterior surface
article
plastic
aforesaid
use
connection
change
correspond
plural
output
provide
possible
processing
item
describe
claim
said
device
means
IDF(S)
IDF'(P):(X',Y')=(X*11.347/(7.344+Y) (for Y<=4.003); X+4.003-Y (for Y>4.003), Y)

FIG. 24

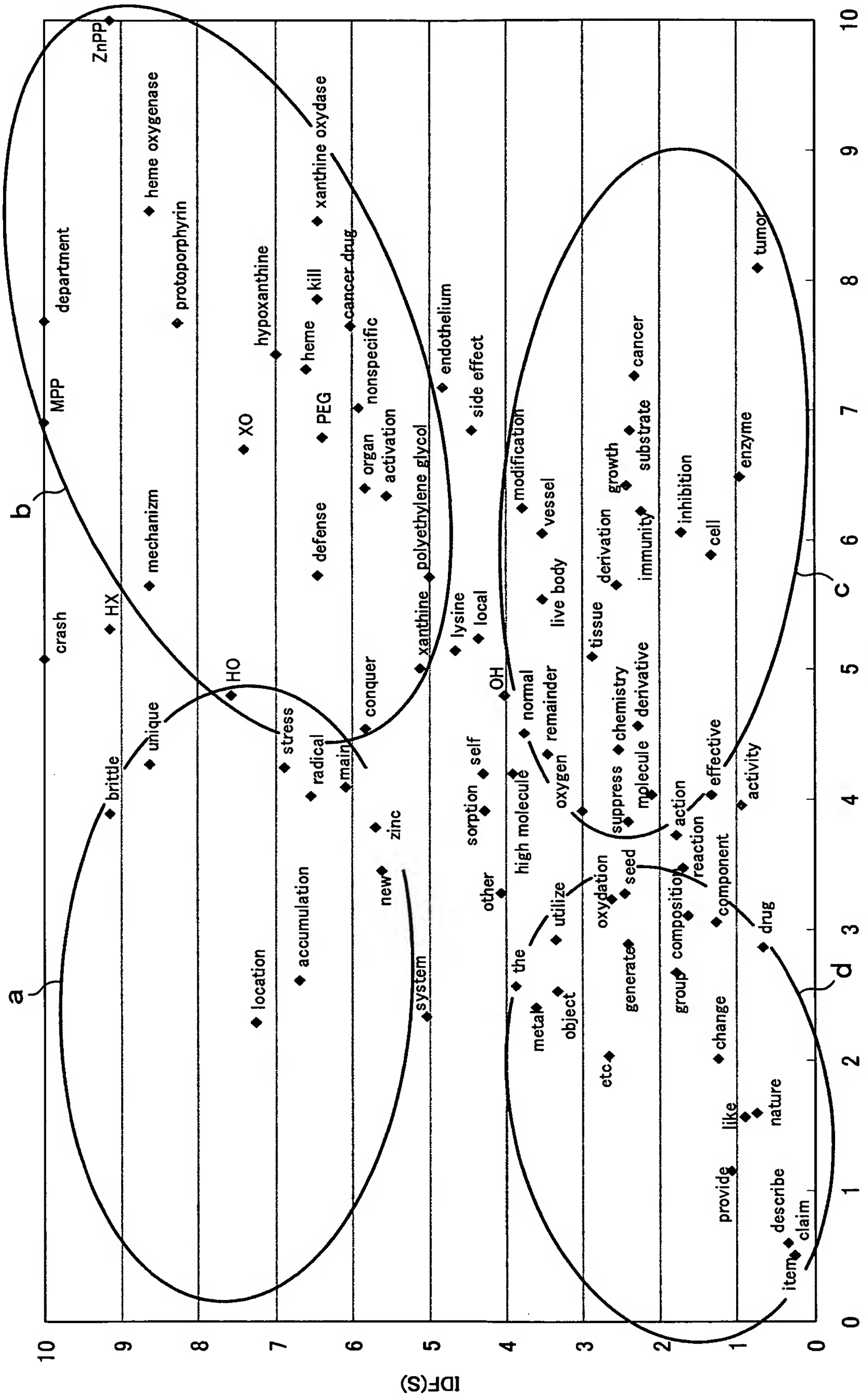

"Antitumor Medicine" IDF Plane
IDF'(P)
IDF(S)
a
b
c
d
ZnPP
department
heme oxygenase
protoporphyrin
hypoxanthine
heme
kill
xanthine oxydase
cancer drug
endothelium
side effect
cancer
tumor
MPP
crash
HX
mechanizm
XO
defense
PEG
organ
activation
polyethylene glycol
modification
vessel
inhibition
cell
enzyme
substrate
growth
immunity
derivation
tissue
live body
lysine
local
HO
unique
brittle
stress
radical
main
conquer
xanthine
OH
normal
remainder
oxygen
suppress
chemistry
molecule
derivative
location
accumulation
new
zinc
system
sorption
self
other
high molecule
action
reaction
effective
activity
the
utilize
oxydation
seed
generate
group
composition
component
drug
object
metal
change
etc
provide
like
nature
describe
claim
item

FIG. 25

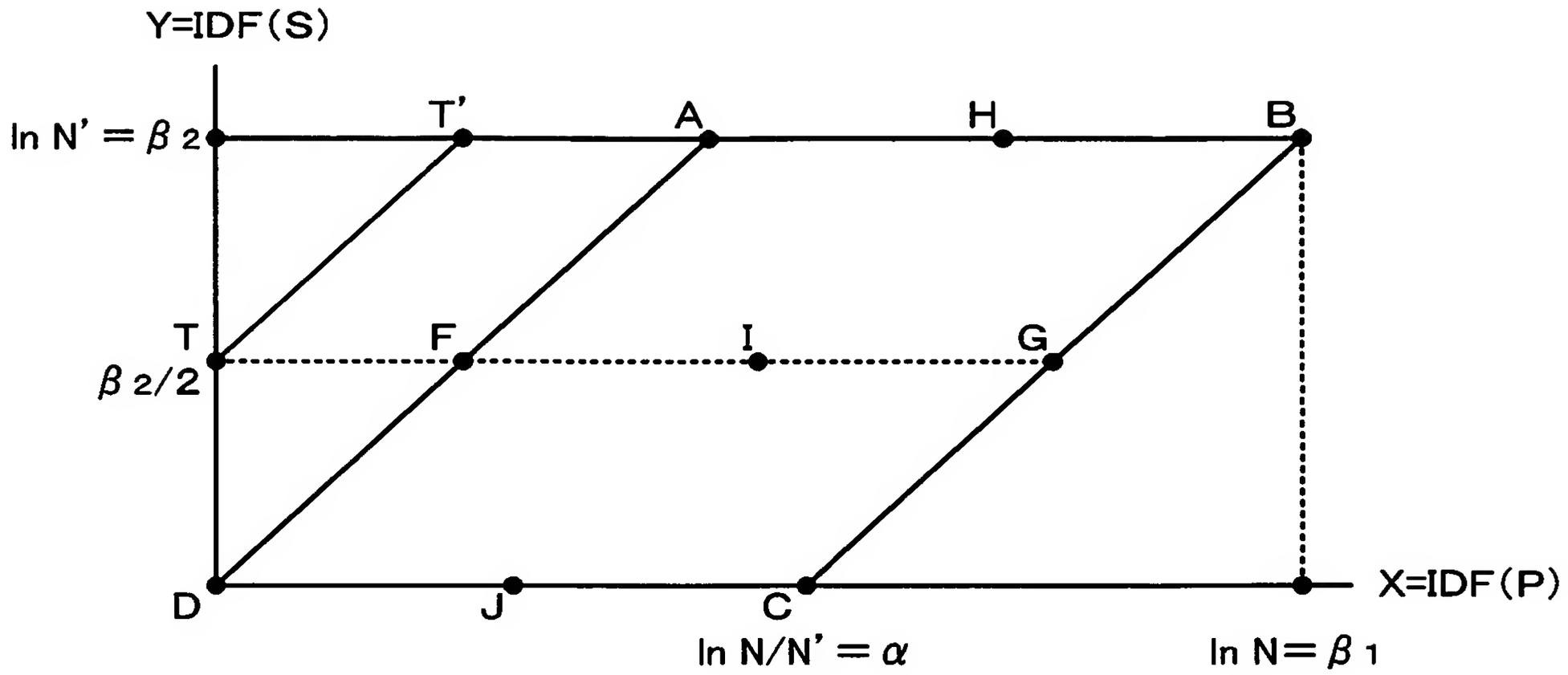
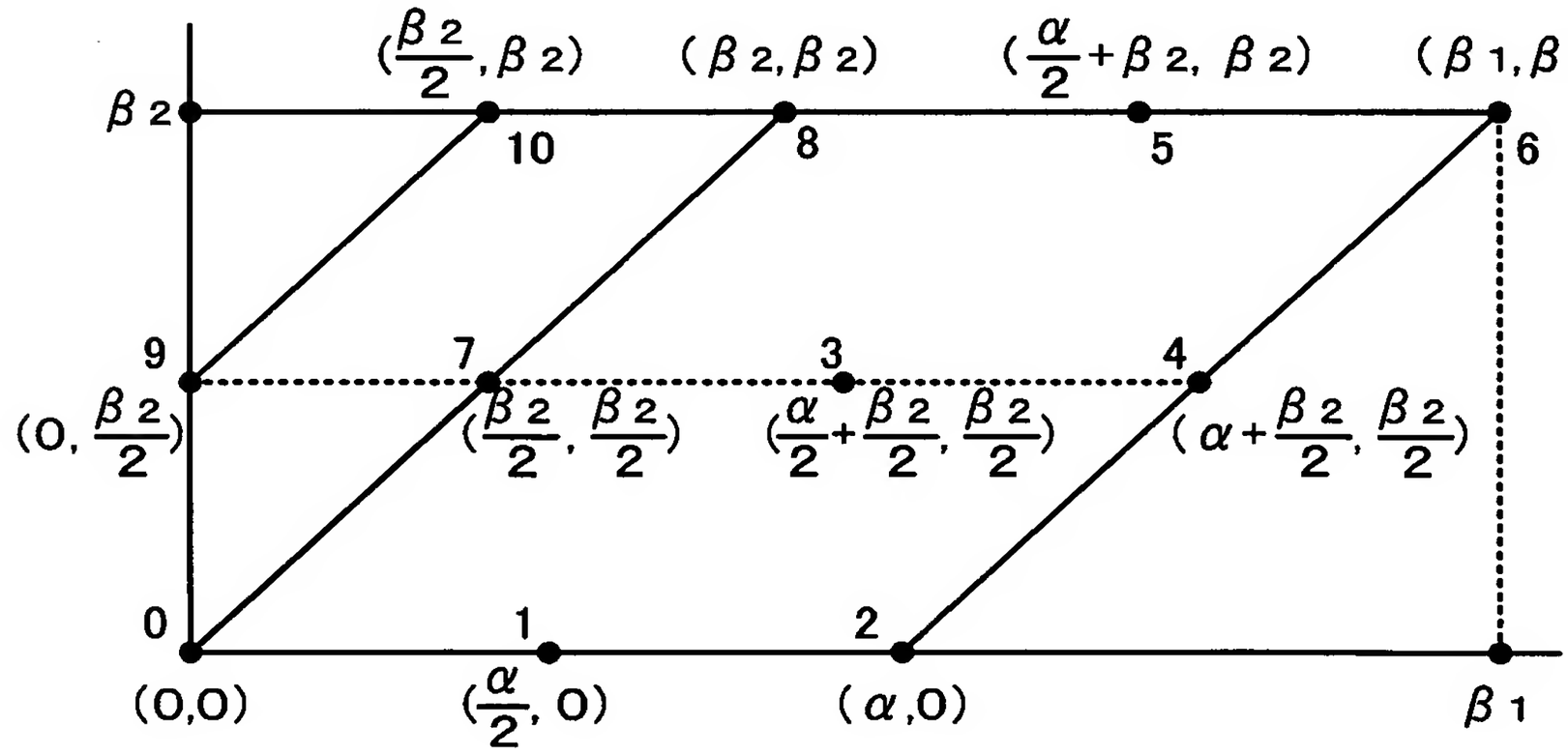


FIG. 26

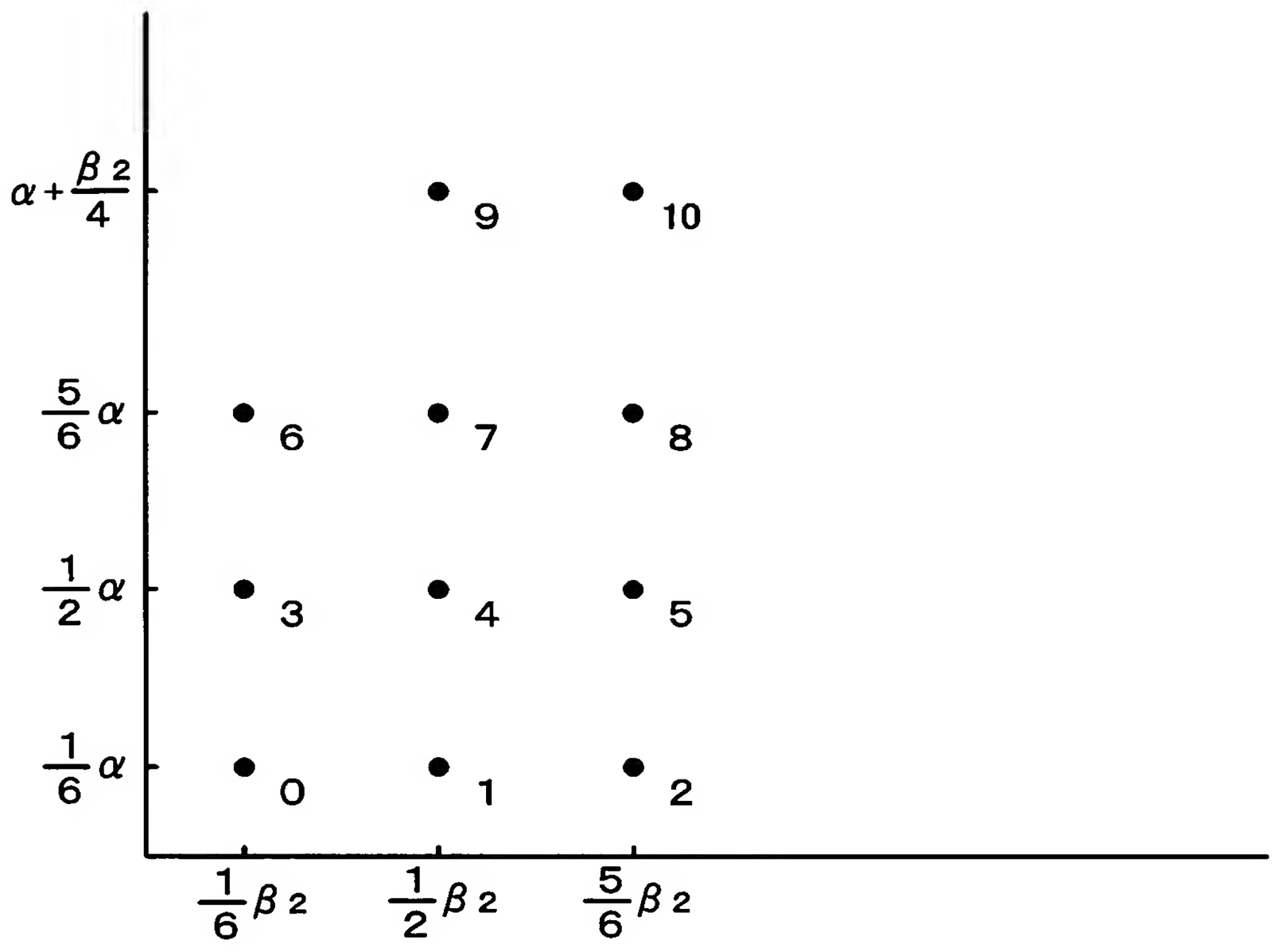


REFERENCE POINTS IN APPLICATION EXAMPLE 1 OF SOM

FIG. 27

"External Auxiliary Storage Device" Application Example 1 of SOM (11-point Orthorhombic Lattice)
a
b
X'
Y'
desire
picture
hologram
exterior surface
plastic
cable
melody
total
create
symbol
IC
all
possesstion
compatibility
article
price
each
wireless
mutual
calculation
music
net
broadcast
notice
card
transmit
sale
expected
character
reading
print
part
keep
sound
every
electronic
server
request
external
function
network
acquire
computer
person
program
communication
editing
selection
image
system
display
record
medium
information
data
internal
aforesaid
use
utilize
change
connection
correspond
provide
plural
output
input
possible
processing
memory
item
describe
claim
said
device
means

FIG. 28



REFERENCE POINTS IN APPLICATION EXAMPLE 2 OF SOM

FIG. 29

"External Auxiliary Storage Device" Application Example 2 of SOM (11-point Lattice Inverse Transformation)

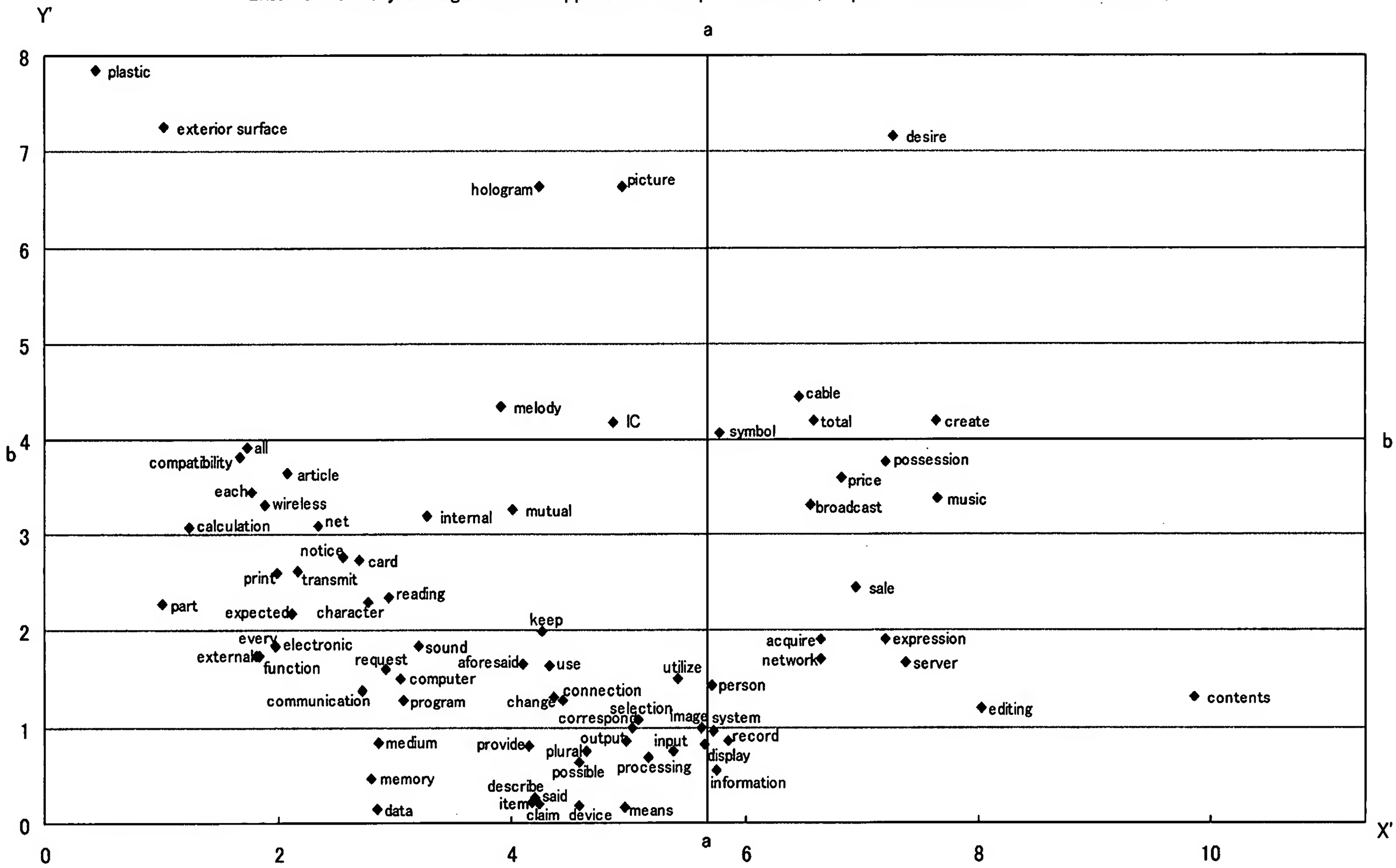
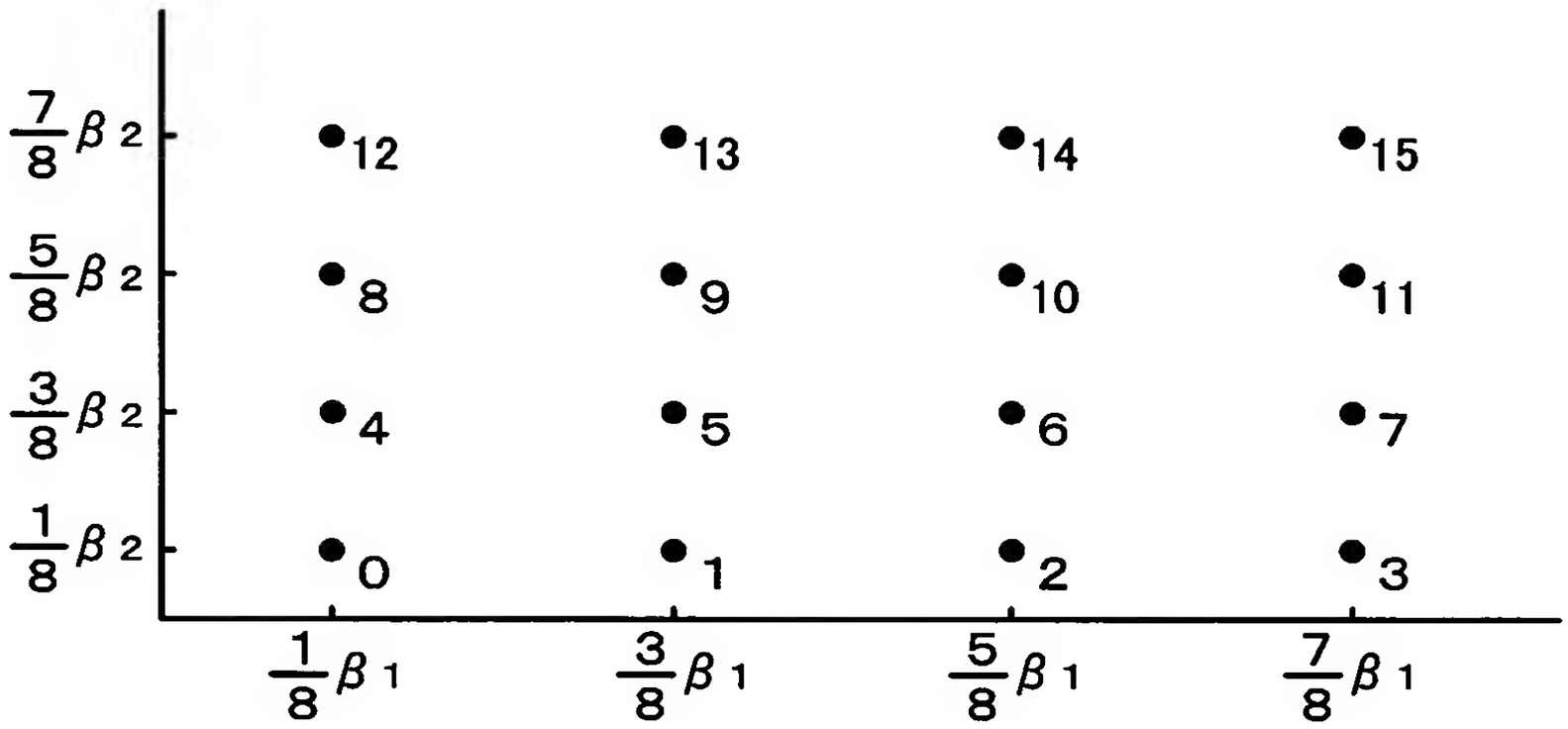


FIG. 30



REFERENCE POINTS IN APPLICATION EXAMPLE 3 OF SOM

FIG. 31

"External Auxiliary Storage Device" Application Example 3 of SOM (16-point Scale Transformation)

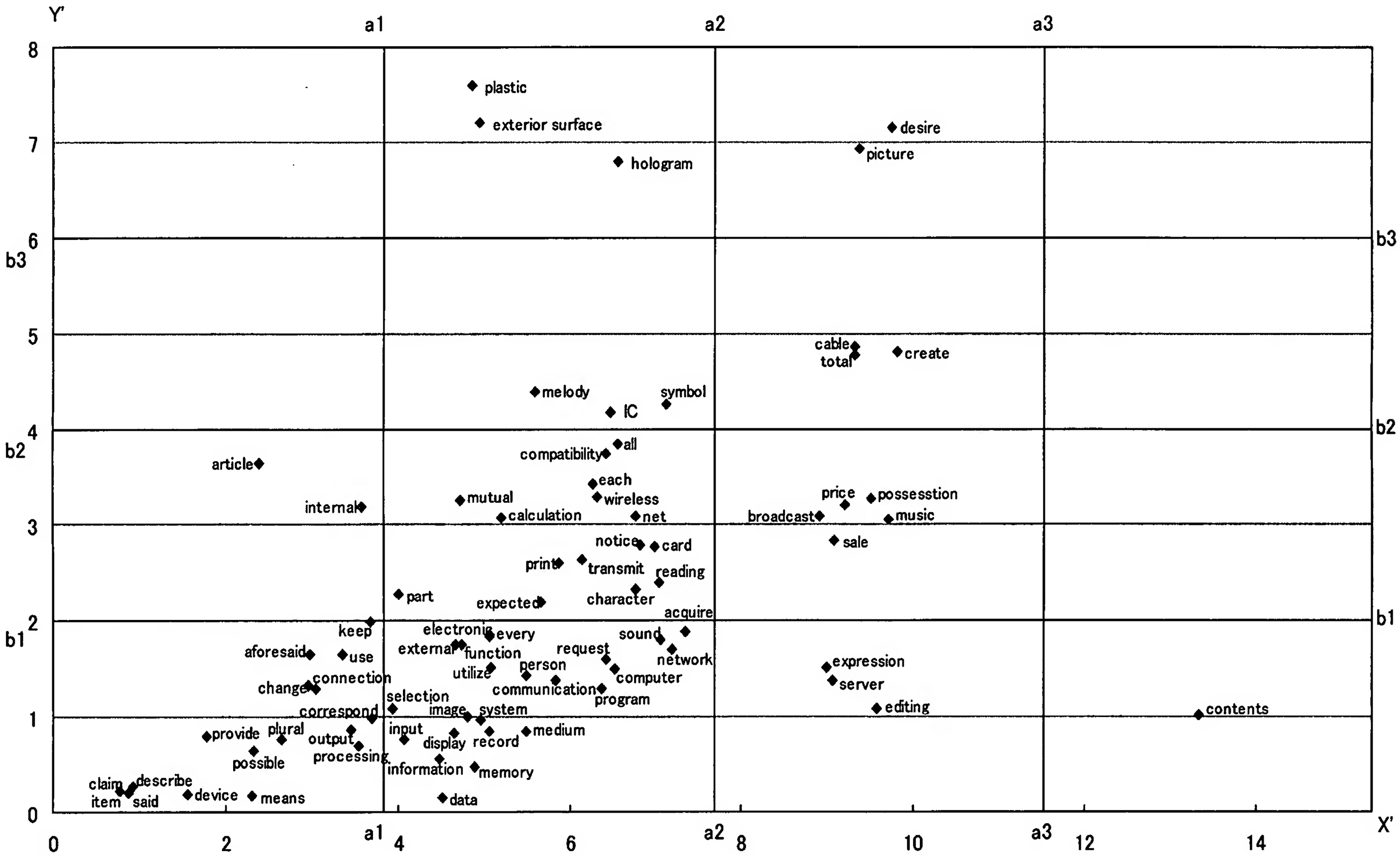


FIG. 32

"External Auxiliary Storage Device" Application Example 4 of SOM (Multi-dimensional Input)
a
b
X'
Y'
plastic
exterior surface
hologram
picture
desire
cable
melody
total
IC
create
symbol
possession
price
broadcast
net
music
transmit
notice
card
reading
sale
expression
contents
sound
acquire
computer
editing
server
aforesaid
medium
internal
character
part
keep
expected
print
request
network
communication
program
correspond
image
system
record
input
display
memory
information
data
person
connection
output
processing
electronic
function
utilize
selection
plural
provide
possible
device
means
said
use
change
every
external
item
describe
claim
article
compatibility
each
wireless
calculation
mutual

FIG. 33

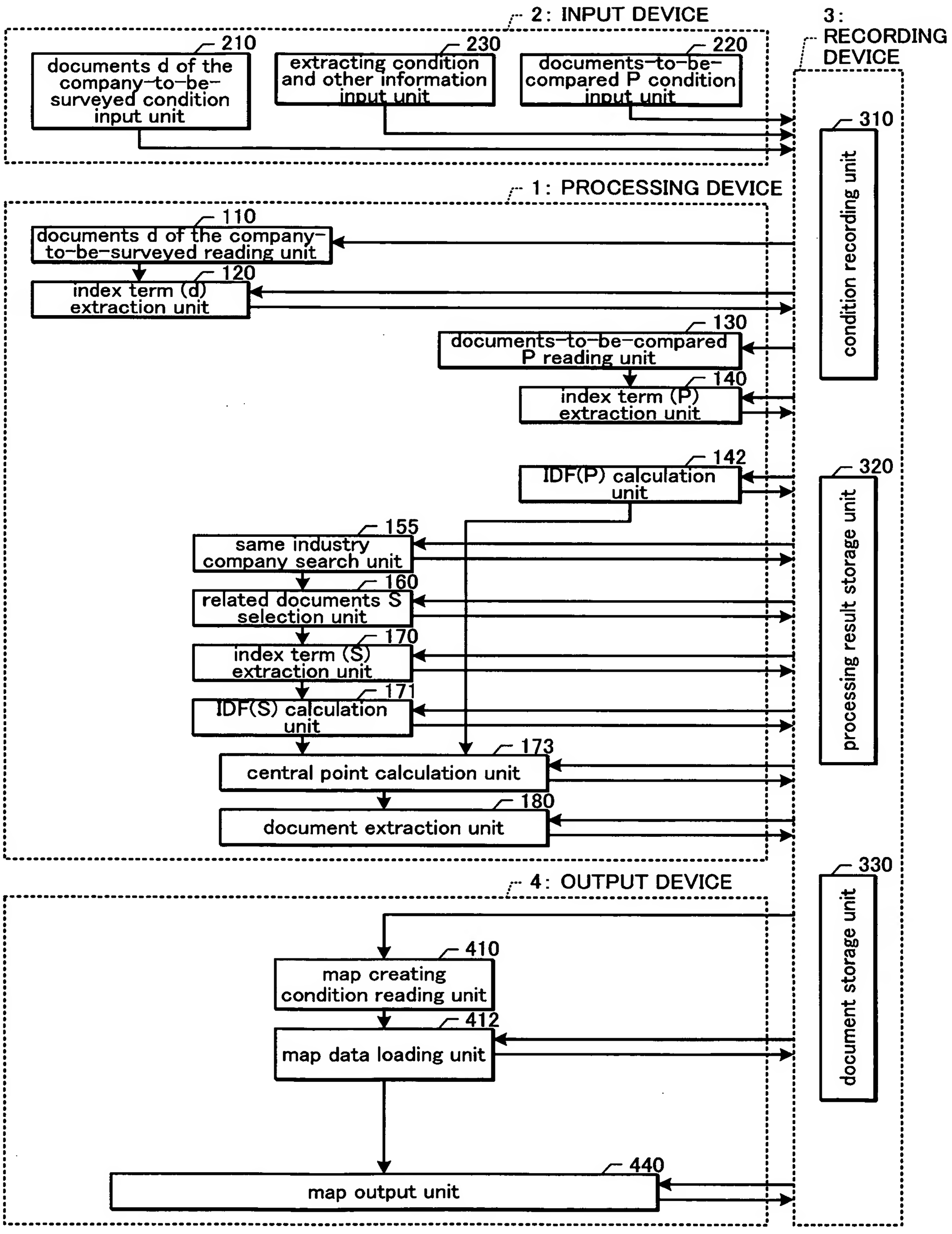

2: INPUT DEVICE
3: RECORDING DEVICE
210
documents d of the company-to-be-surveyed condition input unit
230
extracting condition and other information input unit
220
documents-to-be-compared P condition input unit
310
condition recording unit
1: PROCESSING DEVICE
110
documents d of the company-to-be-surveyed reading unit
120
index term (d) extraction unit
130
documents-to-be-compared P reading unit
140
index term (P) extraction unit
142
IDF(P) calculation unit
320
processing result storage unit
155
same industry company search unit
160
related documents S selection unit
170
index term (S) extraction unit
171
IDF(S) calculation unit
173
central point calculation unit
180
document extraction unit
330
document storage unit
4: OUTPUT DEVICE
410
map creating condition reading unit
412
map data loading unit
440
map output unit

FIG. 34

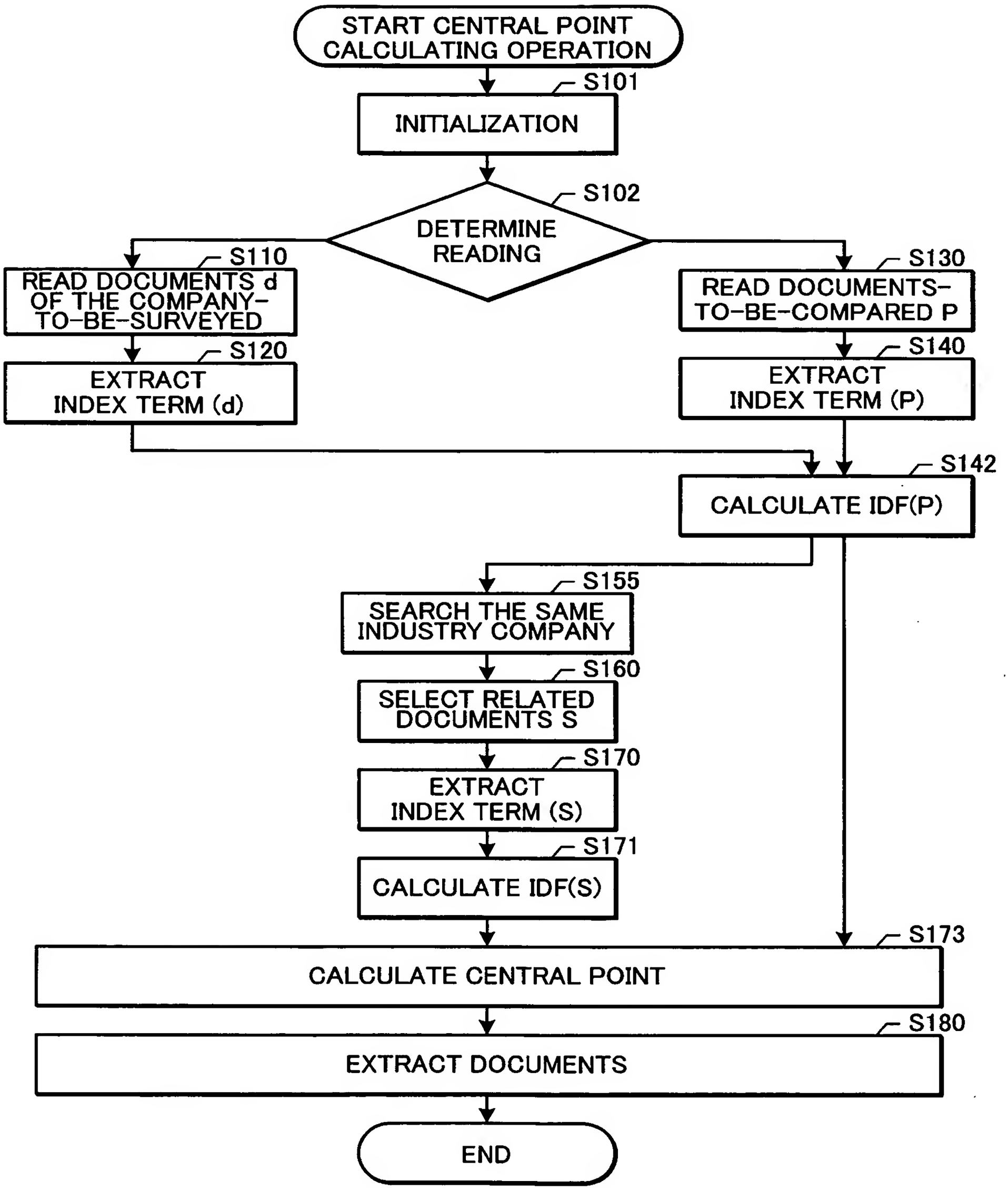

START CENTRAL POINT CALCULATING OPERATION
S101
INITIALIZATION
S102
DETERMINE READING
S110
READ DOCUMENTS d OF THE COMPANY-TO-BE-SURVEYED
S120
EXTRACT INDEX TERM (d)
S130
READ DOCUMENTS-TO-BE-COMPARED P
S140
EXTRACT INDEX TERM (P)
S142
CALCULATE IDF(P)
S155
SEARCH THE SAME INDUSTRY COMPANY
S160
SELECT RELATED DOCUMENTS S
S170
EXTRACT INDEX TERM (S)
S171
CALCULATE IDF(S)
S173
CALCULATE CENTRAL POINT
S180
EXTRACT DOCUMENTS
END

FIG. 35

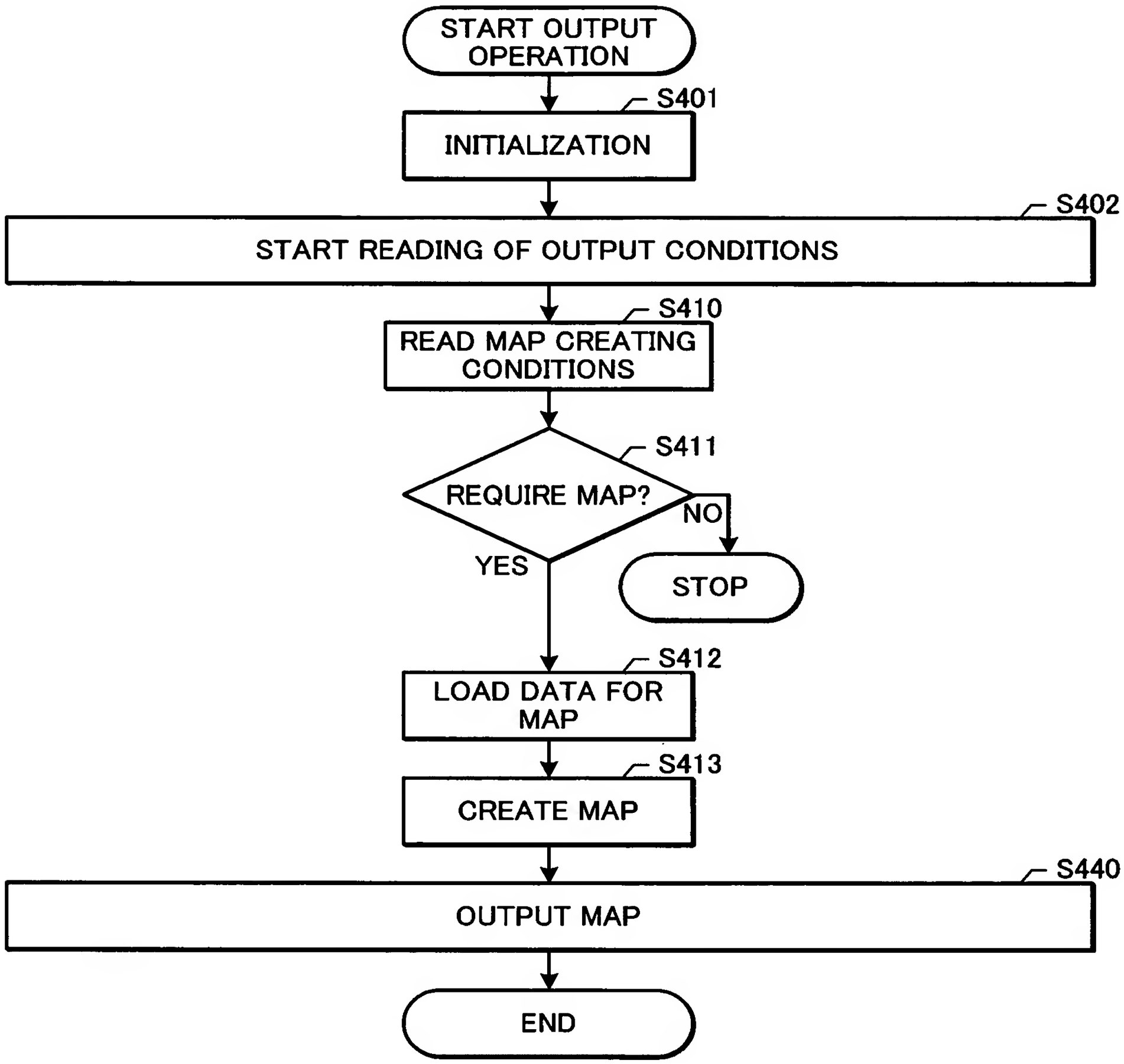

START OUTPUT OPERATION
S401
INITIALIZATION
S402
START READING OF OUTPUT CONDITIONS
S410
READ MAP CREATING CONDITIONS
S411
REQUIRE MAP?
NO
YES
STOP
S412
LOAD DATA FOR MAP
S413
CREATE MAP
S440
OUTPUT MAP
END

FIG. 36

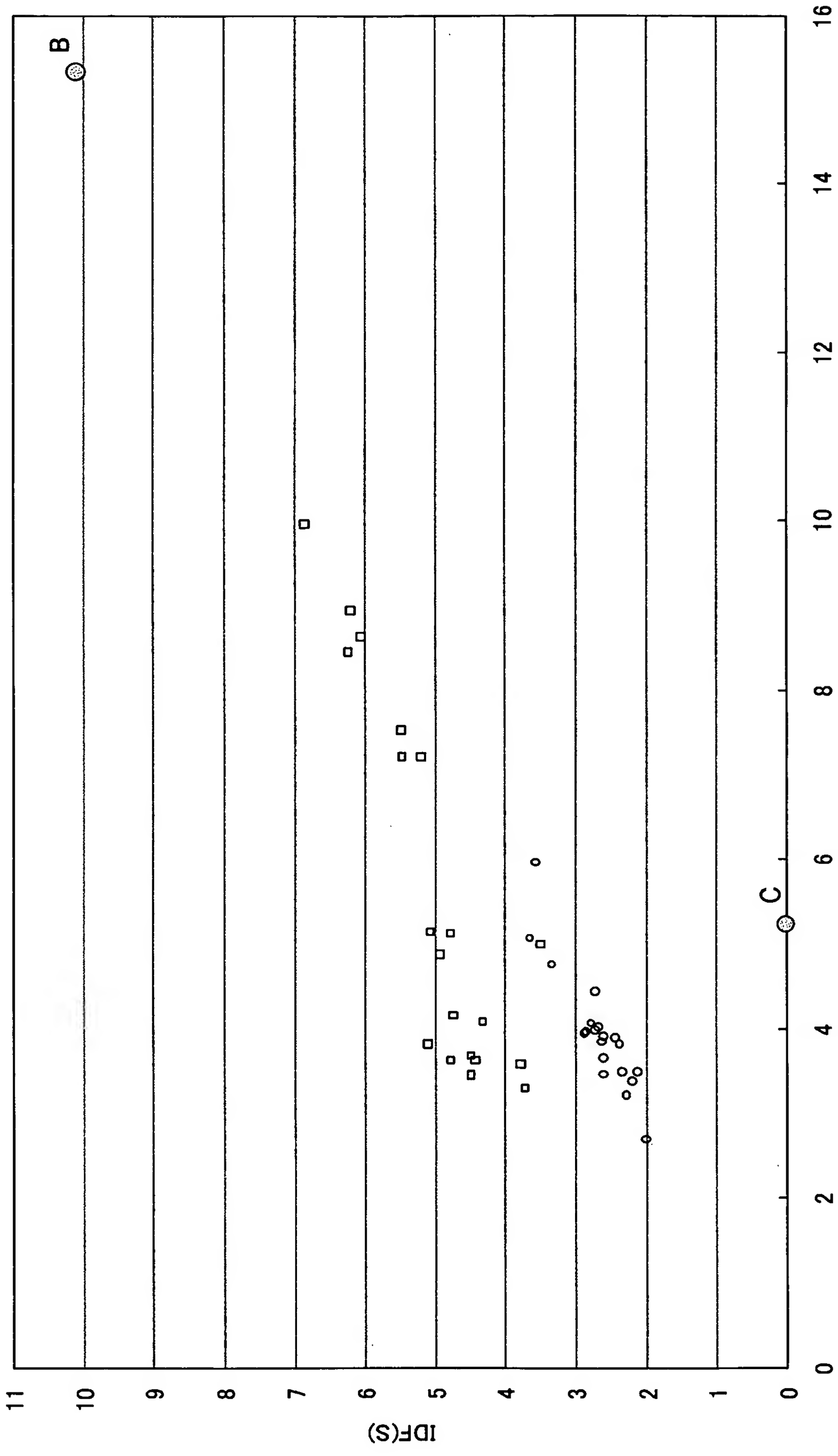
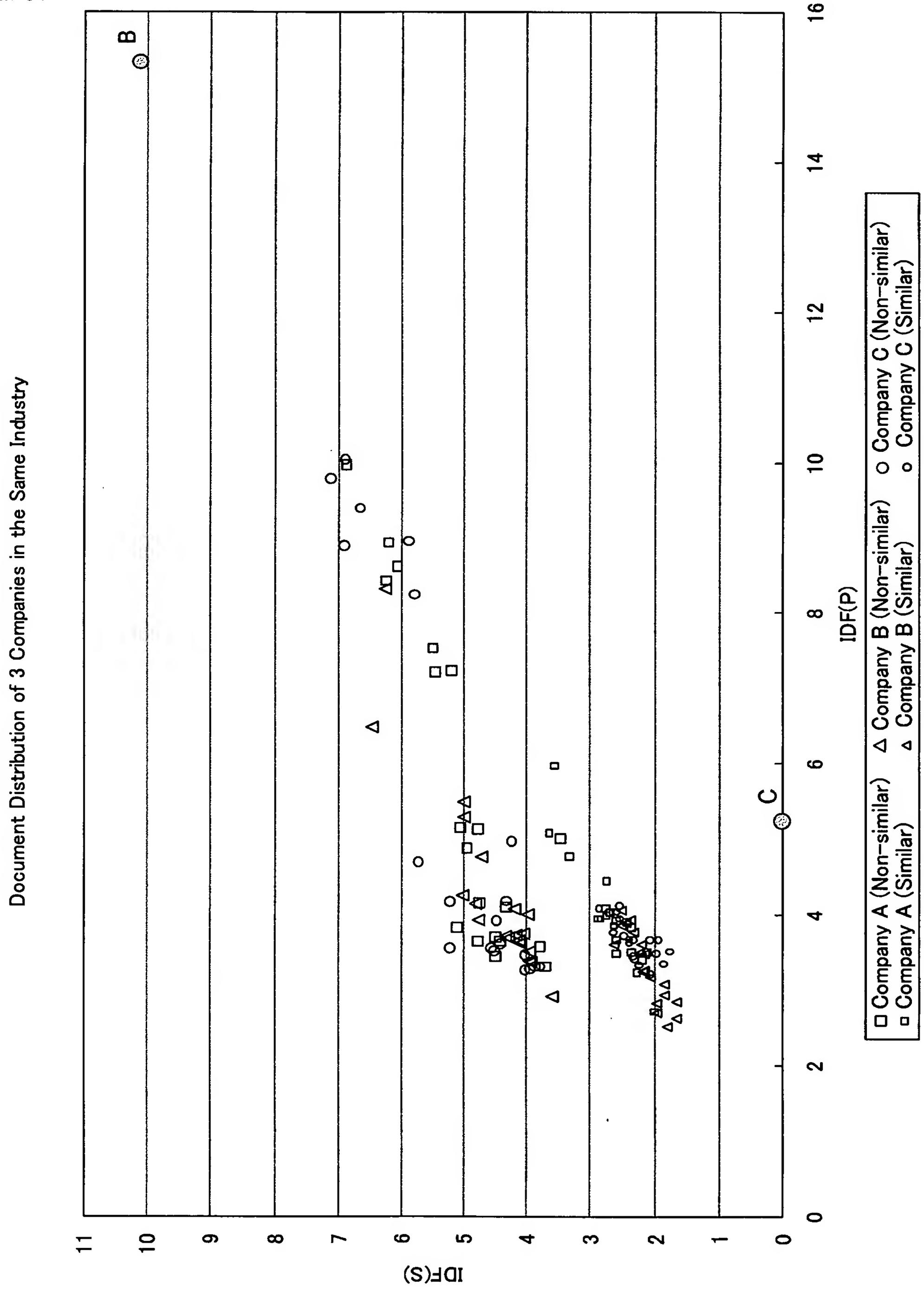

"Company A" IDF Plane
B
C
Non-similar
Similar
IDF(P)
IDF(S)
0
1
2
3
4
5
6
7
8
9
10
11
0
2
4
6
8
10
12
14
16

FIG. 37


Document Distribution of 3 Companies in the Same Industry
IDF(S)
IDF(P)
B
C
Company A (Non-similar)
Company A (Similar)
Company B (Non-similar)
Company B (Similar)
Company C (Non-similar)
Company C (Similar)